393

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DISASSEMBLY INSTRUCTIONS

CHASSIS REMOVAL

1. Remove 4 push-on type knobs from the front.

2. Remove 7 metal screws from the rear cover. Remove the rear cover.

3. Remove the speaker leads, picture tube socket, HV lead and yoke plug.

4. Remove 1 metal screw holding the chassis brace at the top of the chassis.

5. Remove 2 chassis bolts from the bottom.

6. Remove the chassis.

MODEL K1231 (CH. 332)

TRADE NAME	Hoffman	MODELS	CHASSIS
		B1231, B1241, B3311, B3364, K1231, K1241, M1231, M1241, M3311, M3364, P1231, P3311, P3364, W3311	332
		B1231U, B1241U, B1251U, B3311U, B3321U, B3364U, K1231U, K1241U, M1231U, M1241U, M1251U, M3311U, M3321U, M3364U, P1231U, P1251U, P3311U, P3321U, P3364U, W1251U, W3311U, W3321U	332U
		B1251, B3321, M1251, M3321, P1251, P3321, W1251, W3321 ...	333
		Remote Control Unit ... Model RP409	
MANUFACTURER	Hoffman Radio Corp., 6200 S. Avalon Blvd., Los Angeles 3, Calif.		
TYPE SET	Television Receiver		
TUBES	Seventeen		
POWER SUPPLY	110-120 Volts AC, 60 Cycle	RATING	195 Watts, 1.7 Amp. @ 117 Volts AC
TUNING RANGE	Channels 2 thru 13 VHF, 14 thru 83 UHF, Video IF 45.75MC, Sound IF 41.25MC (Intercarrier)		

SERVICING IN THE FIELD

TUNER OSCILLATOR ADJUSTMENTS

Touch-up adjustment of the VHF oscillator is possible by removing the channel selector and fine tuning knobs. Set the fine tuning at the center of its range. The adjustments are accessible, one at a time, as the channel selector is rotated. Adjust for best picture and sound. NOTE: On power tuning models the adjustments are accessible thru a small hole under the trap door covering the channel selector wheel.

PICTURE TUBE SAFETY GLASS CLEANING

Remove 4 metal screws holding the trim strip at the top of the safety glass. Tilt glass out at the top and lift up to remove.

SPECIAL ADJUSTMENTS

A. AGC
Observe the picture and advance the area control to a point where the picture distorts or a buzz is heard in the sound. Back off from this setting until the picture becomes stable with no noise in the sound.

B. Focus
The focus may be varied by the position of a strap on the base of the picture. The strap can be connected between pins 6 and 10 or 6 and 2.

HORIZONTAL OSCILLATOR FIELD ADJUSTMENTS

The horizontal frequency coil is used as the horizontal hold control. Adjust the horizontal frequency until the picture synchronizes horizontally. (For location, see tube placement chart).

FUSES

One fuse is used for LV power supply protection. (For location, see tube placement chart).

CENTERING

Centering is accomplished mechanically by adjusting two magnetic rings around the neck of the picture tube. Rotate the two rings around the neck of the tube until the picture is properly centered.

HOFFMAN MODELS B1231, U, B1241, U, B1251, U, B3311, U, B3321, U, B3364, U, K1231, U, K1241, U, M1231, U, M1241, U, M1251, U, M3311, U, M3321, U, M3364, U, P1231, U, P1251, U, P3311, U, P3321, U, P3364, U, W1251, U, W3311, U, W3321, U (Ch. 332, U, 333)

HOWARD W. SAMS & CO., INC. • Indianapolis 5, Indiana

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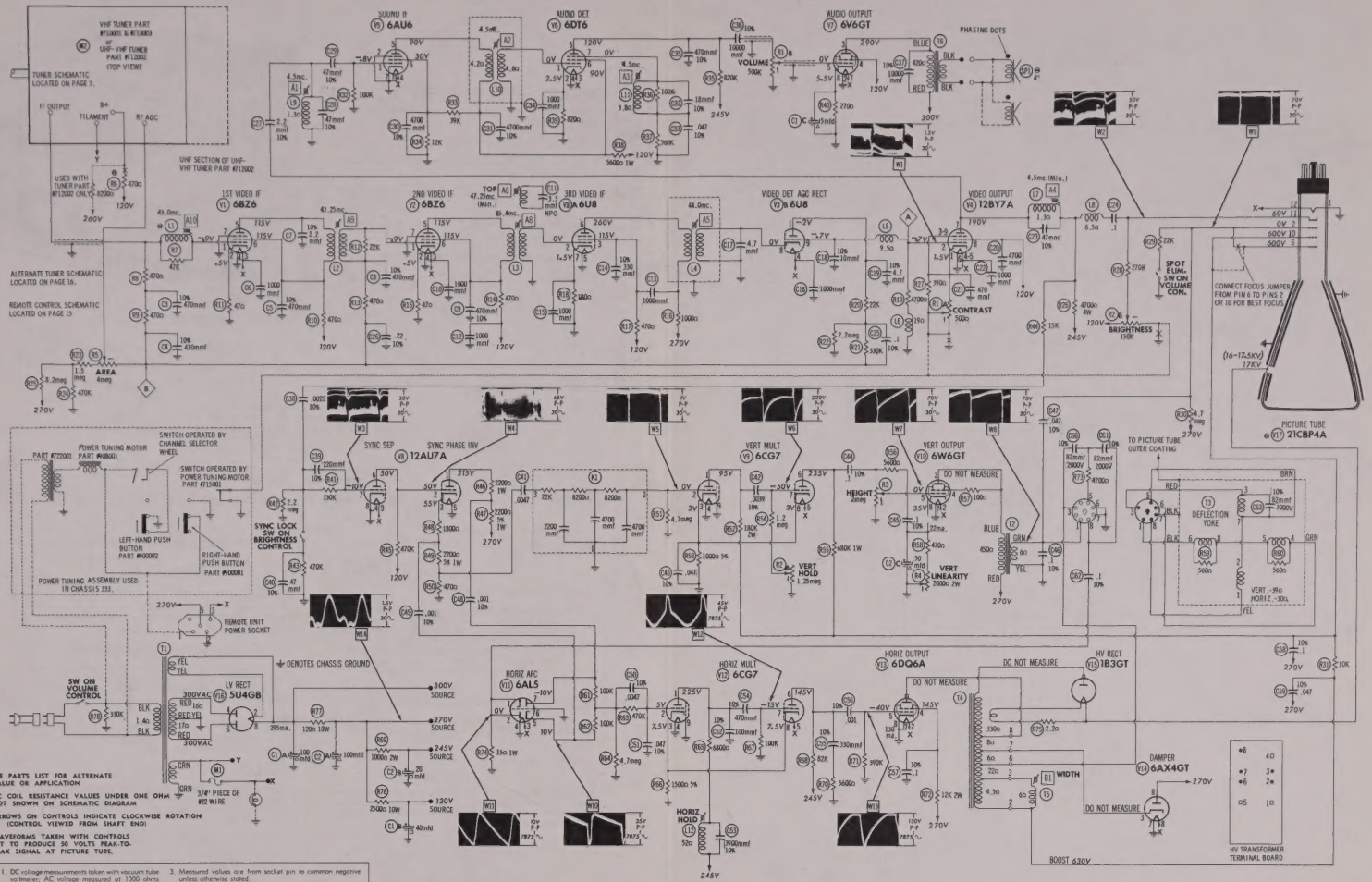
H401

FOLDER 1


VHF TUNER PART #T12002 & #T12003 or UHF-VHF TUNER PART #T12002 (TOP VIEW)
TUNER SCHEMATIC LOCATED ON PAGE 3.
IF OUTPUT
B+
FILAMENT
RF AGC
UHF SECTION OF UHF-VHF TUNER PART #T12002
USED WITH TUNER PART #T12002 ONLY
ALTERNATE TUNER SCHEMATIC LOCATED ON PAGE 16.
REMOTE CONTROL SCHEMATIC LOCATED ON PAGE 15
SOUND IF V5 6AU6
AUDIO DET V6 6DT6
AUDIO OUTPUT V7 6V6GT
PHASING DOTS
VOLUME 500K
1ST VIDEO IF V1 6BZ6
2ND VIDEO IF V2 6BZ6
TOP 47.25mc (Mkr.)
3RD VIDEO IF V3 6U8
VIDEO DET AGC RECT V3 6U8
VIDEO OUTPUT V4 12BY7A
CONTRAST 500Ω
BRIGHTNESS 150K
SPOT ELIM. SW ON VOLUME CON.
CONNECT FOCUS JUMPER FROM PIN 6 TO PINS 2 OR 10 FOR BEST FOCUS
(16-17.5KV) 17KV
PICTURE TUBE V17 21CBP4A
AREA 6meg
POWER TUNING MOTOR PART #GB001
SWITCH OPERATED BY CHANNEL SELECTOR WHEEL
SWITCH OPERATED BY POWER TUNING MOTOR PART #T13001
LEFT-HAND PUSH BUTTON PART #G00002
RIGHT-HAND PUSH BUTTON PART #G00001
POWER TUNING ASSEMBLY USED IN CHASSIS 333.
SYNC LOCK SW ON BRIGHTNESS CONTROL
SYNC SEP V8 12AU7A
SYNC PHASE INV
VERT MULT V9 6CG7
VERT OUTPUT V10 6W6GT
DO NOT MEASURE
HEIGHT 2meg
VERT LINEARITY 2000Ω 2W
VERT HOLD 1.25meg
DEFLECTION YOKE
TO PICTURE TUBE OUTER COATING
REMOTE UNIT POWER SOCKET
DENOTES CHASSIS GROUND
SW ON VOLUME CONTROL
LV RECT V16 5U4GB
300VAC
HORIZ AFC V11 6AL5
HORIZ MULT V12 6CG7
HORIZ OUTPUT V13 6DQ6A
HV RECT V15 1B3GT
DAMPER V14 6AX4GT
WIDTH
HORIZ HOLD
BOOST 630V
HV TRANSFORMER TERMINAL BOARD
SEE PARTS LIST FOR ALTERNATE VALUE OR APPLICATION
DC COIL RESISTANCE VALUES UNDER ONE OHM NOT SHOWN ON SCHEMATIC DIAGRAM
ARROWS ON CONTROLS INDICATE CLOCKWISE ROTATION (CONTROL VIEWED FROM SHAFT END)
WAVEFORMS TAKEN WITH CONTROLS SET TO PRODUCE 50 VOLTS PEAK-TO-PEAK SIGNAL AT PICTURE TUBE.
1. DC voltage measurements taken with vacuum tube voltmeter, AC voltage measured at 1000 ohms per volt.
2. Pin numbers are counted in clockwise direction on bottom of socket.
3. Measured values are from socket pin to common negative unless otherwise stated.
4. Line Voltage maintained at 117 volts for voltage readings.
5. All controls set for normal operation, no signal applied.
A PHOTOFACT STANDARD NOTATION SCHEMATIC
Howard W. Sams & Co., Inc. 1958

HOFFMAN MODELS B1231, U, B1241, U, B1251, U, B3311, U, B3321, U, B3364, U, K1231, U, K1241, U, M1231, U, M1241, U, M1251, U, M3311, U, M3321, U, M3364, U, P1231, U, P1251, U, P3311, U, P3321, U, P3364, U, W1231, U, W3311, U, W3321, U (Ch. 332, U, 333)

FOLDER 1

TUBE PLACEMENT CHART

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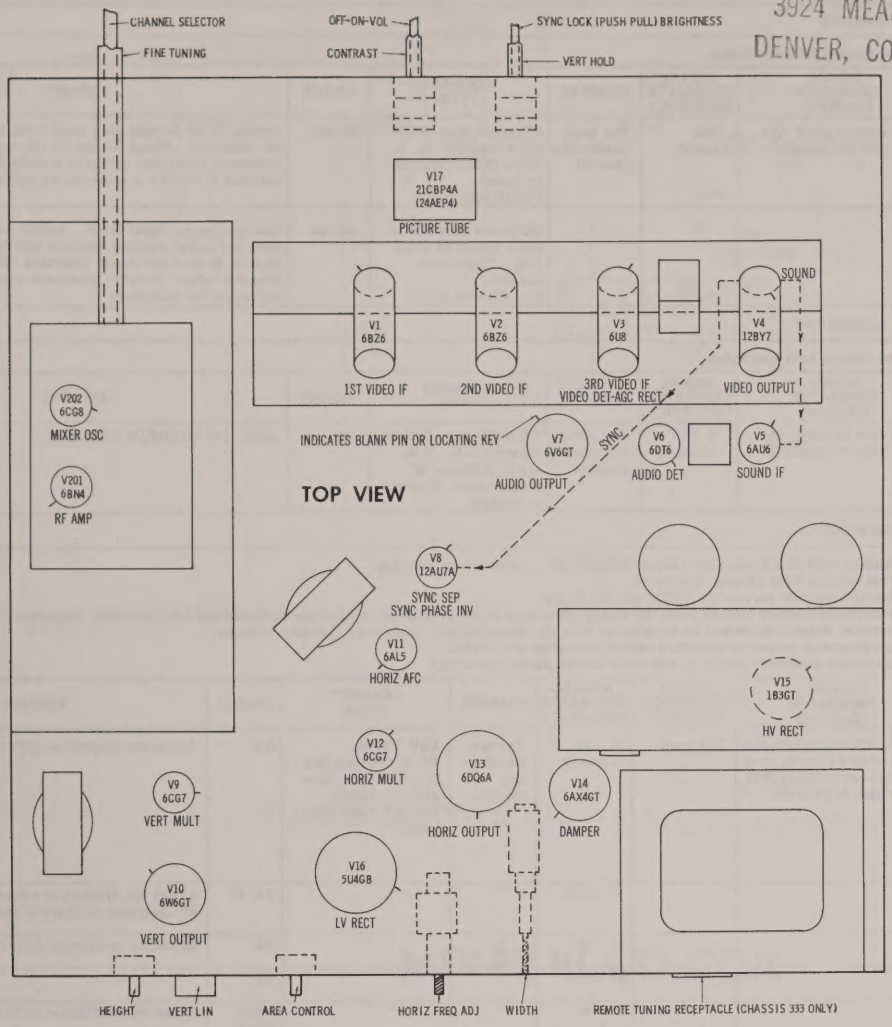


TUBE FAILURE CHECK CHART

The following chart lists tubes whose failures are most likely to produce the indicated symptoms. Refer to tube placement chart for location and type of tube.

POWER SUPPLY FAILURE
No raster, no sound - **Fuse (M1), V16**

LOSS OF PICTURE OR SOUND
No pic, no sound, has raster - **V1, V2, V3, V4**
No pic, no sound, has snow - **V201, V202, V1**
No pic, has sound, has raster - **V4, V17**
Has pic, no sound - **V5, V6, V7**
Overloaded picture - **V3**

SYNC FAILURE
No vert. sync - **V8**
No horiz. sync - **V8, V11**
No vert. or horiz. sync - **V8**

SWEEP FAILURE
No raster, has sound - **V11, V12, V13, V14, V15, V17**
No vertical deflection - **V9, V10**
Poor vert. linearity or foldover - **V9, V10**
Poor horiz. linearity or foldover - **V12, V13, V14**
Narrow picture - **V12, V13, V14, V16**
Vert. off freq. - **V9**
Horiz. off freq. - **V12**

ALIGNMENT INSTRUCTIONS

PRE-ALIGNMENT INSTRUCTIONS

The high voltage lead should be securely taped and kept away from the chassis.
Allow a 20 minute warm-up period for the receiver and test equipment.
Connect the negative lead of a 60 volt bias supply to pin 5 (grid) of the horizontal output tube (V15). Positive to chassis.

SOUND IF ALIGNMENT

Set the contrast control fully clockwise.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	CHANNEL	CONNECT VTVM	ADJUST	REMARKS
1.	.005mfd	High side to point (A). Low side to chassis.	4.5MC (Unmod)	Any non-interfering channel	DC probe thru 10K to pin 2 (cathode) of 6DT6 (V6). Common to chassis. Use 10 volt scale.	A1, A2	Detune A3 by turning slug away from chassis as far as possible. Adjust A1 and A2 for maximum deflection. Attenuate generator output to maintain meter reading between 3.5 and 4.5 volts during this adjustment.
2.	"	"	"	"	DC probe thru 10K to pin 5 (plate) of 6DT6 (V6). Common to chassis. Use 150 volt scale.	A3, A2	Use maximum signal input. Adjust A3 toward chassis until the meter reading reaches MINIMUM, continue turning in until the meter indicates 100 volts plus or minus 3 volts. Remove generator connections and adjust A2 for maximum.

4.5MC TRAP ALIGNMENT

Set the contrast control fully clockwise.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	CHANNEL	CONNECT VTVM	ADJUST	REMARKS
3.	.05mfd	High side to point (A). Low side to chassis.	4.5MC (Unmod)	Any non-interfering channel	DC probe thru detector network (Fig. 1) to pin 11 (cathode) of picture tube. Common to chassis.	A4	Adjust for MINIMUM deflection.

VIDEO IF ALIGNMENT

Connect the negative lead of a 3 volt bias supply to point (B). Positive to chassis.
Turn the contrast control fully counter clockwise.
Connect a 1000mmf capacitor across the VTVM and the scope.
Connect the synchronized sweep voltage from the sweep generator to the horizontal input of the oscilloscope for horizontal deflection.
The sweep generator output lead should be terminated with its characteristic impedance, usually 50 ohms.
Use only enough generator output to provide a usable indication on VTVM.
Use only enough sweep generator output to provide a usable pattern on scope.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
4.	Direct	High side to ungrounded tube shield floating over mixer-osc. tube (V202). Low side to chassis.	Not used	44.0MC (Unmod)	Any non-interfering channel	USE VTVM. DC probe thru 10K to point (A). Low side to chassis. (Across video det. load).	A5	Adjust for maximum deflection.
5.	"	"	"	47.25MC	"	"	A6, A7	Adjust for MINIMUM deflection. NOTE: A7 used only in chassis coded "AJ".
6.	"	"	"	45.4MC	"	"	A8	Adjust for maximum deflection.
7.	"	"	"	43.25MC	"	"	A9	"
8.	"	"	"	43.0MC	"	"	Mixer Plate Coil	Adjust for MINIMUM deflection.
9.	"	"	"	43.0MC	"	"	A10	Adjust for maximum deflection.
10.	"	"	"	45.0MC	"	"	Mixer Plate Coil	"
11.	"	"	44.0MC (10MC Swp)	42.25MC 45.0MC 45.75MC	"	Vert. Amp. thru 10K to point A. Low side to chassis. (across video det. load)		Check for response similar to Fig. 2. If necessary, retouch A5, A8 and A9 for desired response.

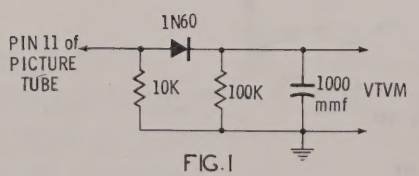


FIG. 1

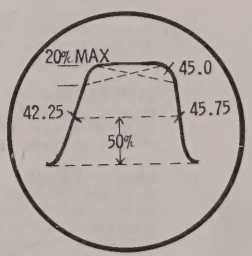
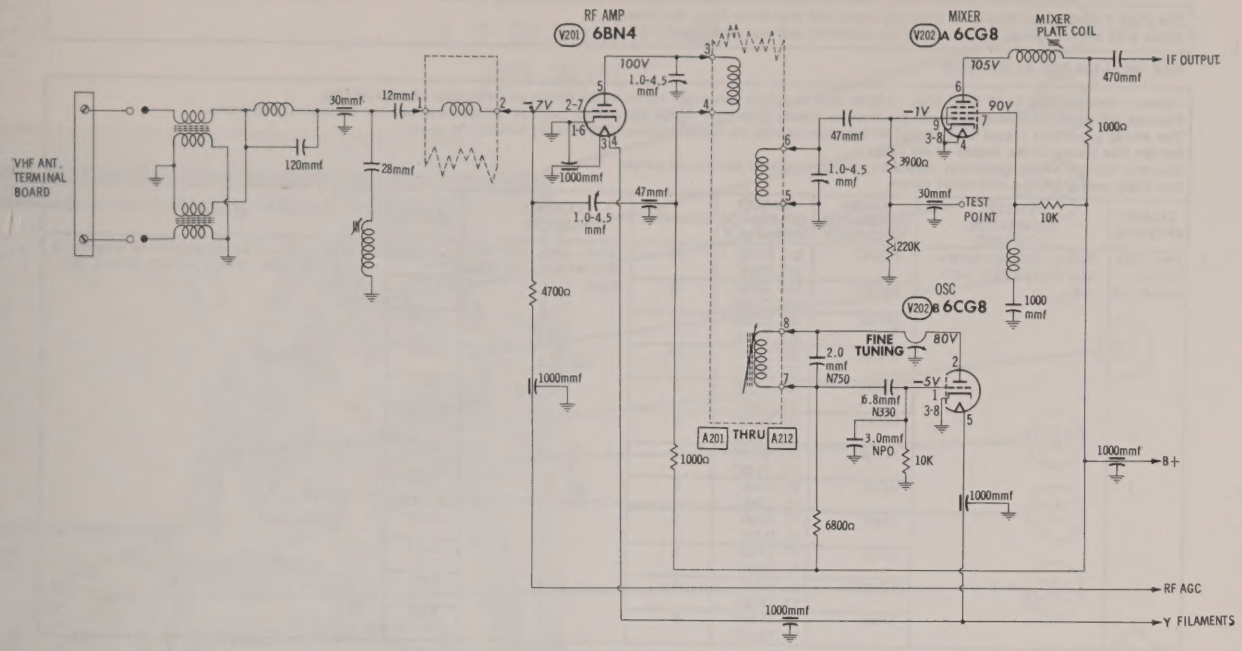


FIG. 2



A PHOTOFACT STANDARD NOTATION SCHEMATIC
Howard W. Sams & Co., Inc. 1958

VHF TUNER PART #710001, 710003, 710009, 710010

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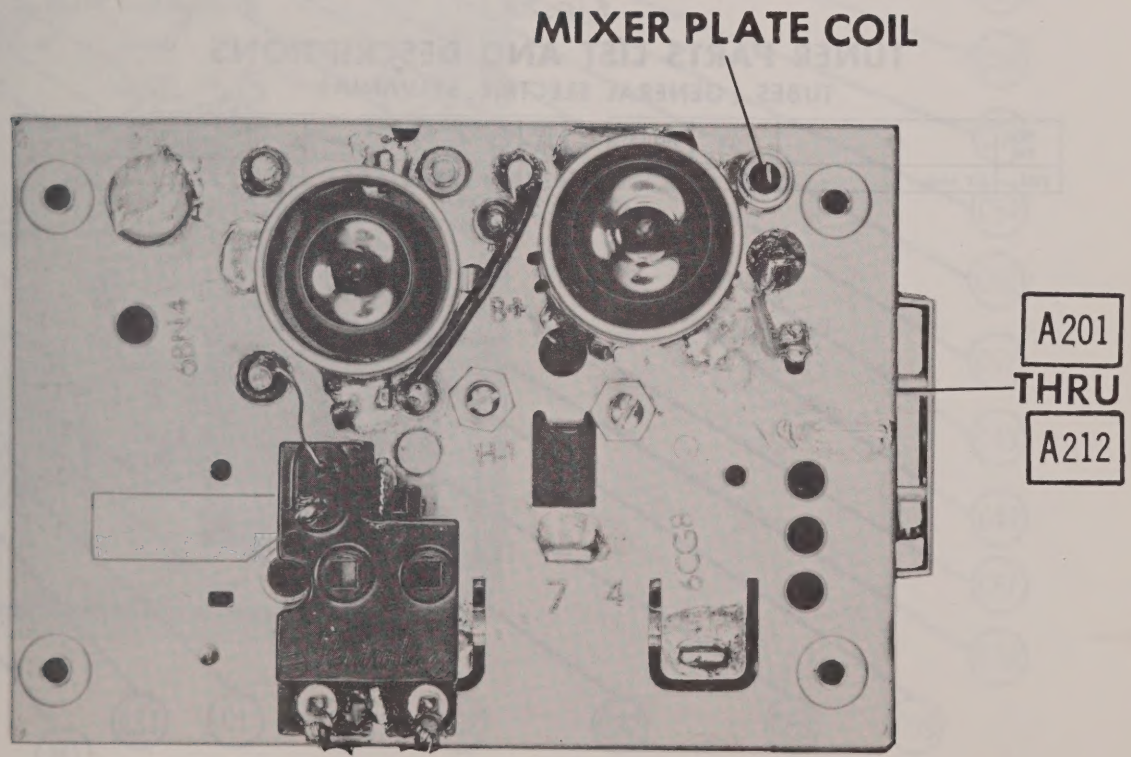
TUNER SCHEMATIC



TUNER-TOP VIEW

TUNER ALIGNMENT INSTRUCTIONS

PRE-ALIGNMENT INSTRUCTIONS

The High Voltage lead should be securely taped and kept away from the chassis.
Allow a 20 minute warm-up period for the receiver and test equipment.

VHF OSCILLIATOR ALIGNMENT

Connect variable bias to IF AGC line. Adjust bias to obtain response curve which shows no indication of overloading.
Connect the synchronized sweep voltage from the sweep generator to the horizontal input of the oscilloscope for horizontal deflection.
The sweep generator output lead should be terminated with its characteristic impedance, usually 50 ohms.
Set the fine tuning to the center of its range.
Use only enough sweep generator output to provide a usable pattern on scope.
Use 10MC sweep unless otherwise noted.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
1.	Two 120Ω Carbon Resistors	Across antenna terminals with 120Ω in each lead.	213MC	211.25MC 215.75MC	13	Vert. amp. thru 47K across video detector load.	A201	Adjust to place sound marker in trap notch as in Fig. 201. Video marker should fall at 50%.
			207MC	205.25MC 209.75MC	12		A202	
			201MC	199.25MC 203.75MC	11		A203	
			195MC	193.25MC 197.75MC	10		A204	
			189MC	187.25MC 191.75MC	9		A205	
			183MC	181.25MC 185.75MC	8		A206	
			177MC	175.25MC 179.75MC	7		A207	
			85MC	83.25MC 87.75MC	6		A208	
			79MC	77.25MC 81.75MC	5		A209	
			69MC	67.25MC 71.75MC	4		A210	
			63. MC	61.25MC 65.75MC	3		A211	
			57MC	55.25MC 59.75MC	2		A212	

VHF RF AND MIXER ALIGNMENT

This portion of the receiver has been properly aligned at the factory and is very stable. Alignment of this portion should not be required in the field.

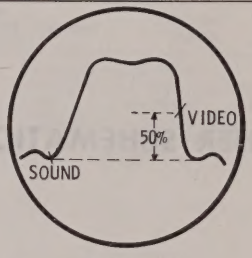


FIG. 201

TUNER PARTS LIST AND DESCRIPTIONS

TUBES (GENERAL ELECTRIC, SYLVANIA)

ITEM No.	USE	TYPE	NOTES
V201	RF Amp.	6BN4	

ITEM No.	USE	TYPE	NOTES
V202	Mixer-Osc.	6CG8	

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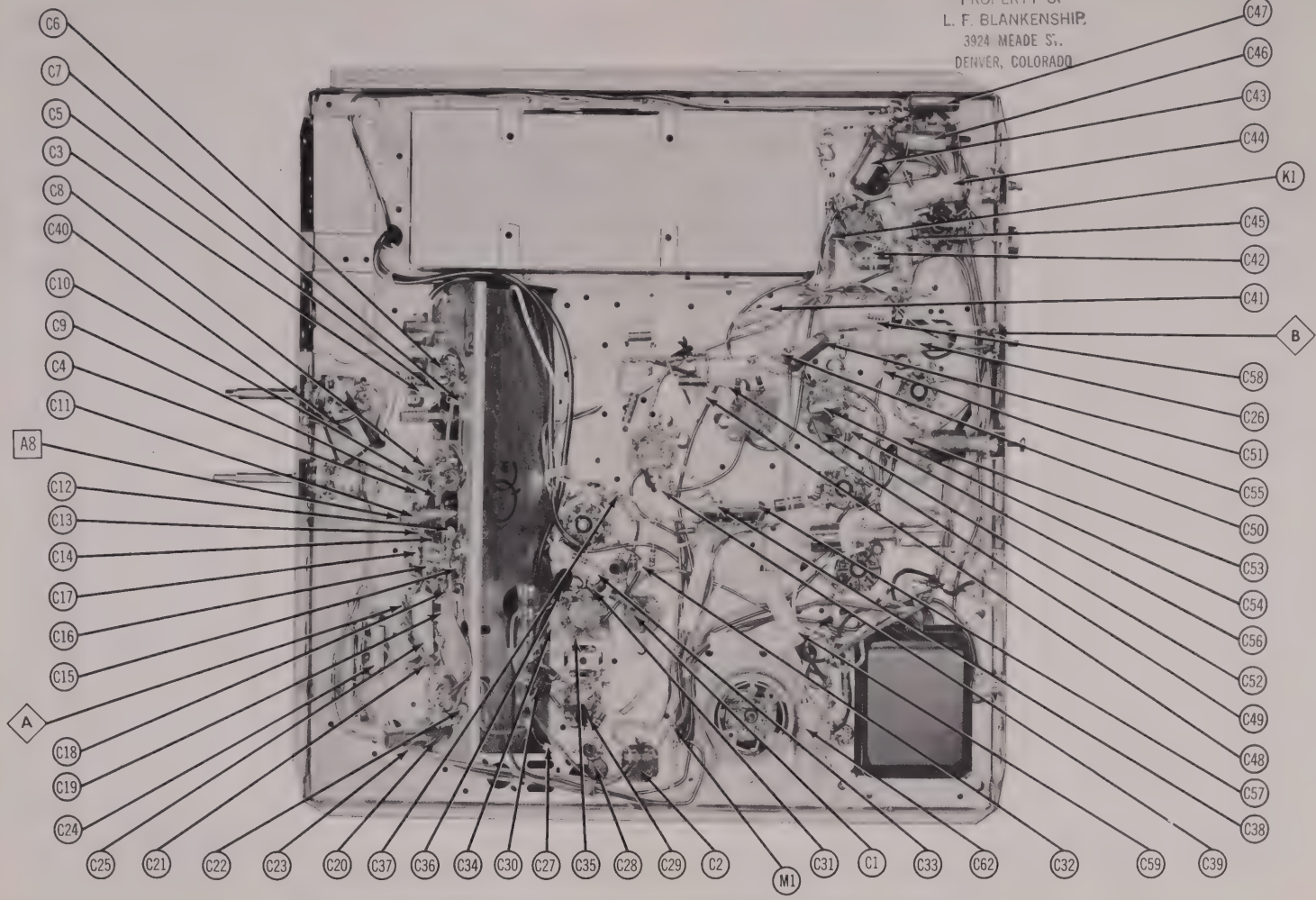
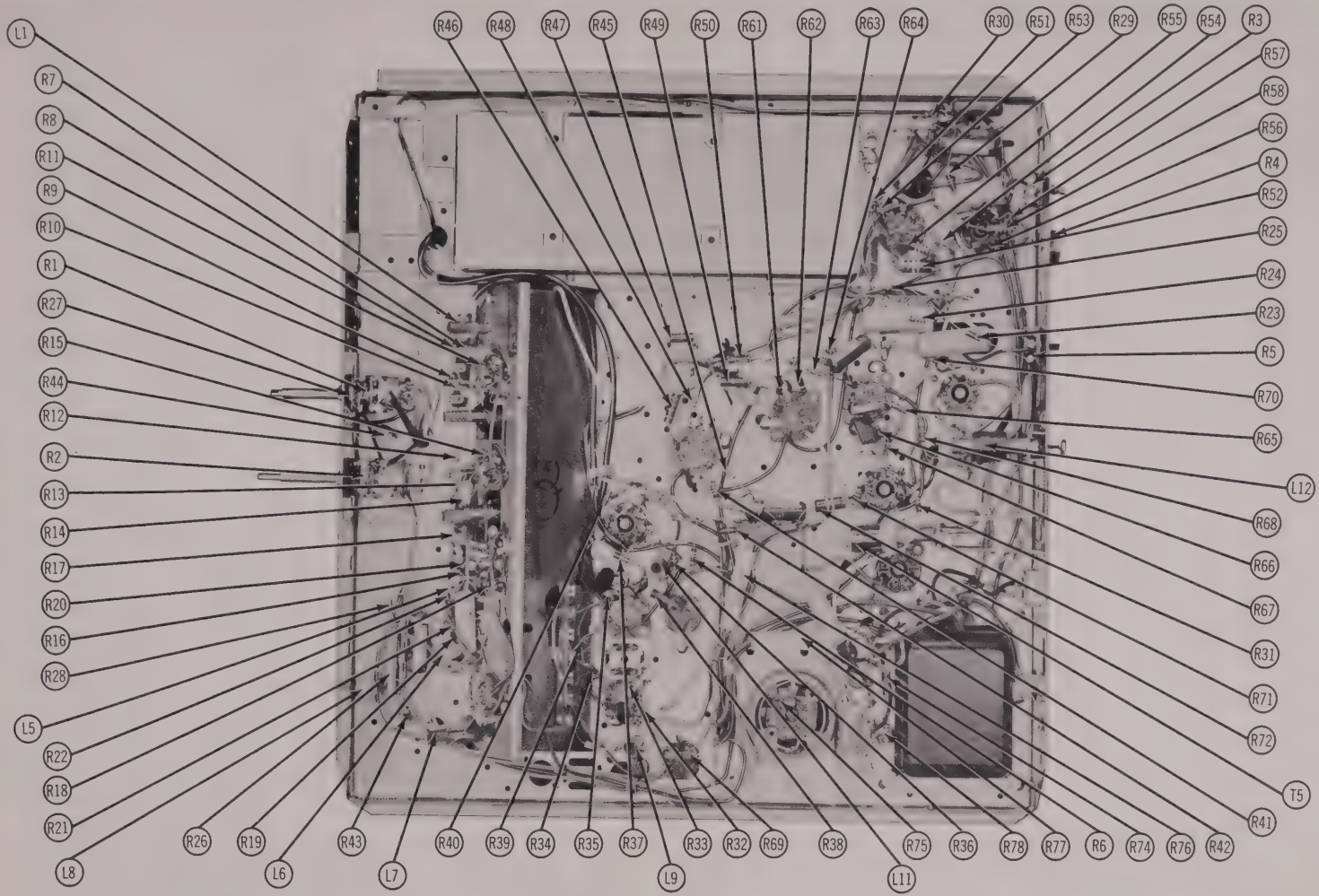


CHASSIS BOTTOM VIEW-TRANS., INDUCTOR AND ALIGNMENT IDENTIFICATION

HOFFMAN MODELS 81231, U, 81241, U, 81251, U, 83311, U, 83321, U, 83364, U, K1231, U, K1241, U, M1231, U, M1241, U, PM1231, U, PM1241, U, P3234, U, P3241, U, P3251, U, P3321, U, P3364, U, W1231, U, W1241, U, W1251, U, W3231, U, W3241, U, W3251, U, 335)

FOLDER 1



CHASSIS BOTTOM VIEW-RESISTOR AND INDUCTOR IDENTIFICATION

HOFFMAN MODELS B1231, U B1231, U B1241, U B1251, U B3311, U B3321, U B3344, U K1231, U K1241, U, M1231, U, M1241, U, M1251, U, M3311, U, M3321, U, M3364, U, P1231, U, P1251, U, P3311, U, P3321, U, P3364, U, W1251, U, W3311, U, W3321, U (Ch. 332, U, 333)

FOLDER 1

PARTS LIST AND DESCRIPTIONS

TUBES (GENERAL ELECTRIC, SYLVANIA)

ITEM No	USE	TYPE	NOTES
V1	1st Video IF Amp	6BZ6	
V2	2nd Video IF Amp	6BZ6	
V3	3rd Video IF Amp + Video Det -AGC Rect	6U8	
V4	Video Output	12BY7	
V5	Sound IF Amp	6AL6	
V6	Audio Det	6DT6	
V7	Audio Output	6V6GT	
V8	Sync Sep -Sync Phase Inv	12AU7A	

ITEM No	USE	TYPE	NOTES
V9	Vert Mult	6CG7	
V10	Vert Output	6W6GT	
V11	Horiz AFC	6AL5	
V12	Horiz Mult	6CG7	
V13	Horiz Output	6DQ6A	
V14	Damper	6AX4GT	
V15	HV Rectifier	1B3GT	
V16	LV Rectifier	5U4GB	

PICTURE TUBE

ITEM No	REPLACEMENT DATA				NOTES
	HOFFMAN PART No	GENERAL ELECTRIC PART No	RCA PART No	SYLVANIA PART No	
V17	21CBP4A 34AEP4		21CBP4 ① 34AEP4 ①	21CBP4/ 34AEP4 ②	① "Silvermax" ② "Silver Screen 65"

ELECTROLYTIC CAPACITORS

ITEM No	RATING CAP	RATING VOLT	REPLACEMENT DATA HOFFMAN PART No	AEROVOX PART No	CORNELL-DUBILIER PART No	MALLORY PART No	PYRAMID PART No	SANGAMO PART No	SPRAGUE PART No	NOTES
C1A	400	350	856905	AFH3-155-50	CO232 BBH5-50	FP247 TC30		Q-912 MT-0504	*X3465	
B	80	250								
C	25	50								
C2A	400	350	856903	AFH4-56-85	CO230 BR505	FP256 TC29		T-110 MT-0550	*X2403	
B	230	350								
C	250	50								

* Non-catalog item

FIXED CAPACITORS

Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING CAP	RATING VOLT	REPLACEMENT DATA HOFFMAN PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ERIE PART No.	MALLORY PART No.	SPRAGUE PART No.	NOTES
C3	470		851123		DS-471	SR5T47	ED-470		36P-347	10%
C4	470		851123		DS-471	SR5T47	ED-470		MS-347	10%
C5	470		851123		DS-471	SR5T47	ED-470		36P-347	10%
C6	1000		850306	BPD-001	DD-102	BYA5DX	ED-1000	DC5H	56K-DX	
C7	3.3		854036	MPO-H 3.3	TCZ-3R3	C3V3ZC	TCO-3.3		5TCCB-V3Z	10%
C8	470		851123		DS-471	SR5T47	ED-470		MS-347	10%
C9	470		851123		DS-471	SR5T47	ED-470		MS-347	10%
C10	1000		850306	BPD-001	DD-103	BYA5DX	ED-1000	DC5H	56K-DX	
C11	3.3			NPO-DI 3.3	TCZ-3R3	C3V3ZC	TCO-3.3	DT-5323	5TCCB-V3Z	NPO
C12	1000		850306	BPD-001	DD-102	BYA5DX	ED-1000	DC5H	56K-DX	
C13	1000		851003	BPD-001	DD-103	BYA5DX	ED-1000	DC5H	56K-DX	
C14	330		850307		DE-331	LU073	ED-330		MS-333	10%
C15	1000		850306	BPD-001	DD-103	BYA5DX	ED-1000	DC5H	56K-DX	
C16	1000		850306	BPD-001	DD-103	BYA5DX	ED-1000	DC5H	56K-DX	
C17	4.7		854039	NPO-HI 4.7	TCZ-4R7	C3V4ZC	TCO-4.7	DT-5547	5TCCB-V4Z	10%
C18	10		854043	HI 10	DS-100	L2Q4Z	ED-10	DT-541	5TCC-Q	10%
C19	4.7		854039	NPO-HI 4.7	TCZ-4R7	C3V4ZC	TCO-4.7	DT-5547	5TCCB-V4Z	10%
C20	4700			BPD-0047	DD-472	BYA10D47	ED-0047	UC-5347	5GA-D47	
C21	470			BPD-00047	DD-471	BYA10Z47	ED-470	UC-5347	5GA-T47	
C22	1000			BPD-001	DD-102	BYA5DX	ED-1000	DC5H	56K-DX	
C23	47		854061	NPO-DI 47	DD-470	L2Q4Z	ED-47		5TCC-Q47	10%
C24	.1	600		P4883-1	DF-104	CU104P1		GEM-401	47M-P1	
C25	1	200	856175					GEM-201		10%
C26	22	200	856179					GEM-3022		10%
C27	2.2		854035	NPO-HI 2.2	TCZ-2R2	C3V2ZC	TCO-2.2		5TCCB-V2Z	10%
C28	47		854061	NPO-DI 47	DD-470	L2Q4Z	ED-47		5TCC-Q47	10%
C29	47		854061	NPO-DI 47	DD-470	L2Q4Z	ED-47		5TCC-Q47	10%
C30	4700		856359			1R5D47	CY30C472K		MS-347	10%
C31	4700		856359			1R5D47	CY30C472K		MS-347	10%
C32	18		854048		TCZ-18	C3Q4ZC	TCO-18		5TCC-Q18	10%
C33	.047	200	856171					GEM-1615		10%
C34	1000		850306	BPD-001	DD-102	BYA5DX	ED-1000	DC5H	56K-DX	
C35	470		851123		DS-471	SR5T47	ED-470		MS-347	10%
C36	10000		856363					GEM-1625		10%
C37	10000		856363					GEM-1625		10%
C38	.0022	400	856356							10%
C39	220		850309	NPO-HI 220	DS-221	L2T22	ED-220		MS-322	10%
C40	47		854061	NPO-DI 47	DD-470	L2Q4Z	ED-47		5TCC-Q47	10%
C41	.0047	200	856159					GEM-16347		10%
C42	.0022	400	856356							10%
C43	.047	200	856171					GEM-1615		10%
C44	1	600	856175					GEM-601		10%
C45	1	200	856175					GEM-201		10%
C46	1	400	856175					GEM-401		10%
C47	.047	200	856171					GEM-1615		10%
C48	001	200	856151							10%
C49	001	200	856151							10%
C50	.0047	200	856159					GEM-16347		10%
C51	.047	200	856171					GEM-1615		10%
C52	100		854055	1468-0001	DS-101	2SR5T1	ED-100	MCR235	MS-31	10%
C53	3900		856358	1464-0039		1R5D39			MS-339	10%
C54	470		851132		DS-471	SR5T47	ED-470		MS-347	10%
C55	330		850207	1464-00033	DE-331	SR5T33	ED-330		MS-333	10%
C56	001	400	856151							10%
C57	1	600	856175					GEM-401		10%
C58	1	600	856175					GEM-601		10%
C59	.047	600	856171					GEM-1615		10%
C60	82	2000	850103							10%
C61	82	2000	850103							10%
C62	1	600	856175					GEM-601		10%
C63	82	3000								10%

CONTROLS

ITEM No	RATING RESISTANCE	RATING WATTS	REPLACEMENT DATA HOFFMAN PART No	CENTRALAB PART No	CLAROSTAT PART No	IRC PART No	MALLORY PART No	INSTALLATION NOTES
R2A	500Ω	½	803021	F1-1	RTV-848	• QJ-1075	•• U3376H5	Contrast
B	500K	½		R2-40	Not Req.			Volume
C	Switch			SWE-20 *	Not Req.		U3376H5	AC & Spot Eliminator
R3A	1 25meg	½	803022					Vert. Hold
B	150K						Not Req.	Brightness
C	Switch						Not Req.	Sync Lock
R3A	2meg	½	800012	BX-75	A47-2meg-S	QH-139	PTA35L	Height
B	Shaft			Not Req.	FKS-1/4	Not Req.	Not Req.	
R4	2000Ω	2(WW)	808002		39-2000		FL-2.5K	Vert. Linearity
R5A	4meg	1	800013	AB-88	A47-4meg-S			Area
B	Shaft			AK-1	FKS-1/4			

* Use KR-3 on rod label control.
• "Concentrikit" Equivalent: K-8 Kit, Base Elements & Shafts B11-103, P17-136 (Panel) B13-133, R1-306 (Rear) 76-2 (Switch)
•• "STA-LOC" Equivalent: FA52L, OF175O, RU55A, HS267, U8-43.

RESISTORS

All wattages 1/2 watt, or less, unless otherwise listed.

ITEM No.	RATING OHMS	RATING WATT	HOFFMAN PART No.	NOTES
R6	470Ω		814188	
R7	47K		814212	
R8	470Ω		814188	
R9	470Ω		814188	
R10	470Ω		814188	
R11	47Ω		814176	
R12	22K		814308	
R13	470Ω		814188	
R14	470Ω		814188	
R15	47Ω		814176	
R16	1000Ω		814198	
R17	470Ω		814188	
R18	180Ω		814183	
R19	4700Ω		814300	
R20	33K		814308	
R21	330K		814323	
R22	2.2meg		814332	
R23	1.5meg		814330	
R24	470K		814324	
R25	6.2meg	4	814239	
R26	4700Ω	4	814198	
R27	390Ω		814187	
R28	270K		814321	
R29	470Ω		814308	
R30	4.7meg		814236	
R31	10K		814304	
R32	100K		814316	
R33	39K		814311	
R34	15K		814305	
R35	680K		814337	
R36	100K		814316	
R37	560K		814325	
R38	56000	1	814209	
R39	68Ω		814181	
R40	270Ω		814185	
R41	330K		814323	
R43	2.2meg		814332	

ITEM No	RATING OHMS	RATING WATT	HOFFMAN PART No.	NOTES
R43	15K		814206	
R44	470K		814324	
R45	470K		814324	
R46	2200Ω	1	812203	
R47	2200Ω 5%	1	816071	
R48	1800Ω		814195	
R49	2200Ω 5%	1	816071	
R50	560Ω		814188	
R51	4.7meg		814235	
R52	180K	2	812319	
R53	1000Ω 5%		814063	
R54	1 2meg		814229	
R55	680K	1	814233	
R56	5800Ω		814201	
R57	100Ω		814180	
R58	4700	1	814195	
R59	560Ω		814189	
R60	560Ω		814189	
R61	100K		814216	
R62	100K		814316	
R63	470K		814324	
R64	4.7meg		814236	
R65	680Ω		814203	
R66	1500Ω 5%		814067	
R67	100K		814216	
R68	82K		814315	
R69	1000Ω	2	812193	
R70	560Ω		814201	
R71	390K		814233	
R72	18K		814305	
R73	4700Ω		814300	
R74	15Ω	1	816177	
R75	2.5Ω		811166	
R76	25000	10	625444	
R77	1200	10	83538	
R78	330K		814323	

TRANSFORMER (POWER)

ITEM No.	RATING PRI.	RATING SEC. 1	RATING SEC. 2	REPLACEMENT DATA HOFFMAN PART No.	Halldorson PART No.	Merit PART No.	Ram PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.
T1	117V	560VCT ① 1.7A	5V ② 2.95A ③ 3A	716008			P-3055 ①	P-8335 ②	26R92 ③	
	SEC. 3	SEC. 4	SEC. 5							
	6.3V ② 9.8A									

① Taps 6.3V ② 4.5A winding.
② Parallel and phase 6.3V filament windings.
③ Taps 6.3V ② 4.8A , and 6.3V ③ 1.2A windings.

TRANSFORMERS (SWEEP CIRCUITS)

ITEM No.	USE	REPLACEMENT DATA HOFFMAN PART No.	Halldorson PART No.	Merit PART No.	Ram PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.	NOTES
T2	Vert. Output	728002	21900 ①	A-2823	V307	A-8142 ②	26S77	A-108X	
T3A	Yoke-Horiz. (20MH)	T90002	DF601	MDF-92	V30719/43	DY-48A	T-16	T-41 &	
B	(90°) Vert. (38MH)		③ ④	⑤⑥	⑤⑥	⑤	③④⑤	NW4 ③④	
M3	Rear Cover & Centering Device	864003							
T4	Horiz. Output	783003	FB419 •	HVO-36 •	X094 •	HO-358 •	FLY-16 •	D-25 •	
T5	Width Coil (3-17MH)	776003	RF800 ⑦ ⑧	MWC-1	201U16	WC-18	WC-18 ⑧	WLC-8	

① Use 8 to 1 turns ratio.
② Drill new mounting hole(s).
③ Correct horizontal yoke damping network across yoke terminals #3 and #7.
④ Use original horizontal damping network, if necessary.
⑤ Use original rear cover and centering device.
⑥ Enlarge mounting hole.
⑦ Use terminals #1 and #2.

*HORIZONTAL OUTPUT TRANSFORMER CONNECTION DATA

Use Original Width Coil Unless Replacement Type Is Listed

	ORIGINAL TERMINAL CONNECTIONS	Halldorson Replacement Connections	Merit Replacement Connections	Ram Replacement Connections	Stancor Replacement Connections	Thordarson Replacement Connections	Triad Replacement Connections
	8	9	9	9	9	9	5
	7	7	7	7	7	7	4
	6	5	5	5	5	5	3
	3	3	3	3	3	3	2
	2	1	1	1	1	1	1
Connect Width Coil Across	3 & 2	3 & 1	3 & 1	3 & 1	3 & 1	3 & 1	3 & 1
Special Notes							

TRANSFORMER (AUDIO OUTPUT)

ITEM No	IMPEDANCE PRI.	IMPEDANCE SEC.	REPLACEMENT DATA HOFFMAN PART No.	Halldorson PART No.	Merit PART No.	Ram PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.	NOTES
T6	7500Ω	3-4Ω	724003	22115	A-2921	AU-602 ①	A-8116 ①	24S63	S-7X	① Drill new mounting hole.

SPEAKER

ITEM No	TYPE SIZE	TYPE FIELD	TYPE V C IMP	REPLACEMENT DATA HOFFMAN PART No	QUAM PART No	NOTES
SP1	4"	PM	3-4Ω	708003 ①	4A07	① Used in Models B1231, U, U1231, U, M1231, U, P1231, U, B1241, U, K1241, U, M1241, U, P1241, U, B1251, U, M1251, U, P1251, U, B3321, U, P3321, U, P3364, U, W1231, U, W1241, U, W1251, U, W3311, U, W3321, U (Ch. 332), U, 333)
	5½"	PM		708009 ②		
	8"	PM		708601 ②		
	4" x 6"	PM		708603 ②		② Used in Models B331, U, M331, U, P331, U, W331, U, B332, U, M332, U, P332, U, W332, U, B3364, U, M3364, U, P3364, U
						① Used in Models B332, U, M332, U, P332, U, W332, U, B3364, U, M3364, U, P3364, U
						① Used in Models B331, U, M331, U, P331, U, W331, U

COILS (RF-IF)

ITEM No	USE	REPLACEMENT DATA HOFFMAN PART No.	Meissner PART No.	Merit PART No.	Miller PART No.	Ram PART No.	NOTES
L1	1st. Video IF	782005	17-4534	TV-131		VF-4	Note 1
L2	2nd. Video IF	782009	17-4532	TV-130	6319	VF-3	
L3	3rd. Video IF	782007	17-4536		6223		Includes 47. 25MC Trap
L4	4th. Video IF	780004	17-5004	TV-126	6224		
L5	Series Peaking Coil	771008	19-3100	TV-161	6113	VP-3	100 Microhenries
L6	Shunt Peaking Coil	771019		TV-207	6156		330 Microhenries
L7	4.5MC Trap	782005	20-1004	TV-151	1469 *	SF-3	
L8	Series Peaking Coil	771030	19-3250	TV-185	6181	VP-5	250 Microhenries
L9	1st. Sound IF	782005	20-1004	TV-151	1469 *	SF-3	
L10	2nd. Sound IF	780003	17-3495	TV-113	6303	SF-2	
L11	Quadrature Coil	776001	20-1007	TV-132	1480		

TRANSFORMER (HORIZ. OSC.)

ITEM No.	DC RES. PRI.	DC RES. SEC.	REPLACEMENT DATA HOFFMAN PART No.	Meissner PART No.	Merit PART No.	Miller PART No.	Ram PART No.	Thordarson PART No.	NOTES
L12	52Ω		768004	19-1578	TV-163	6210	H-102	HS-5	

COMPONENT COMBINATIONS

ITEM No.	USE	DESCRIPTION	HOFFMAN PART No	REPLACEMENT DATA	
K1	Vert. Integrator	2200mmf, 470mmf, 4700mmf, 22K, 6200Ω,8200Ω	98600L	Aerovox Centralab Cornell-Dubilier Erie Sprague	PA-110 PC-104 1U27M3 1405-01 V-1

FUSES

ITEM No.	TYPE	RATING	REPLACEMENT DATA HOFFMAN PART No. FUSE	HOFFMAN PART No. HOLDER	LITTELFUSE PART No. FUSE	LITTELFUSE PART No. HOLDER	BUSS PART No. FUSE	BUSS PART No. HOLDER
M1	3/4" #22 Wire							

MISCELLANEOUS

ITEM No.	PART NAME	HOFFMAN PART No.	NOTES
M3	Tuner	710003	VHF - Ch. 332
	Tuner	710010	VHF - Ch. 332 (Coded "C" or "D")
	Tuner	710001	VHF - Ch. 333
	Tuner	710009	VHF - Ch. 333 (Coded "C" or "D")
	Tuner	713002	UHF-VHF - Ch. 333U
M3	Centering Device	864003	Includes centering device

HOFFMAN MODELS B1231, U, B1241, U, B1251, U, B3321, U, B3364, U, K1231, U, K1241, U, M1231, U, M1241, U, M1251, U, M3321, U, M3364, U, P1231, U, P1241, U, P1251, U, P3321, U, P3364, U, W1231, U, W1241, U, W1251, U, W3311, U, W3321, U (Ch. 332), U, 333)

FOLDER 1

PARTS LIST AND DESCRIPTIONS (Continued)

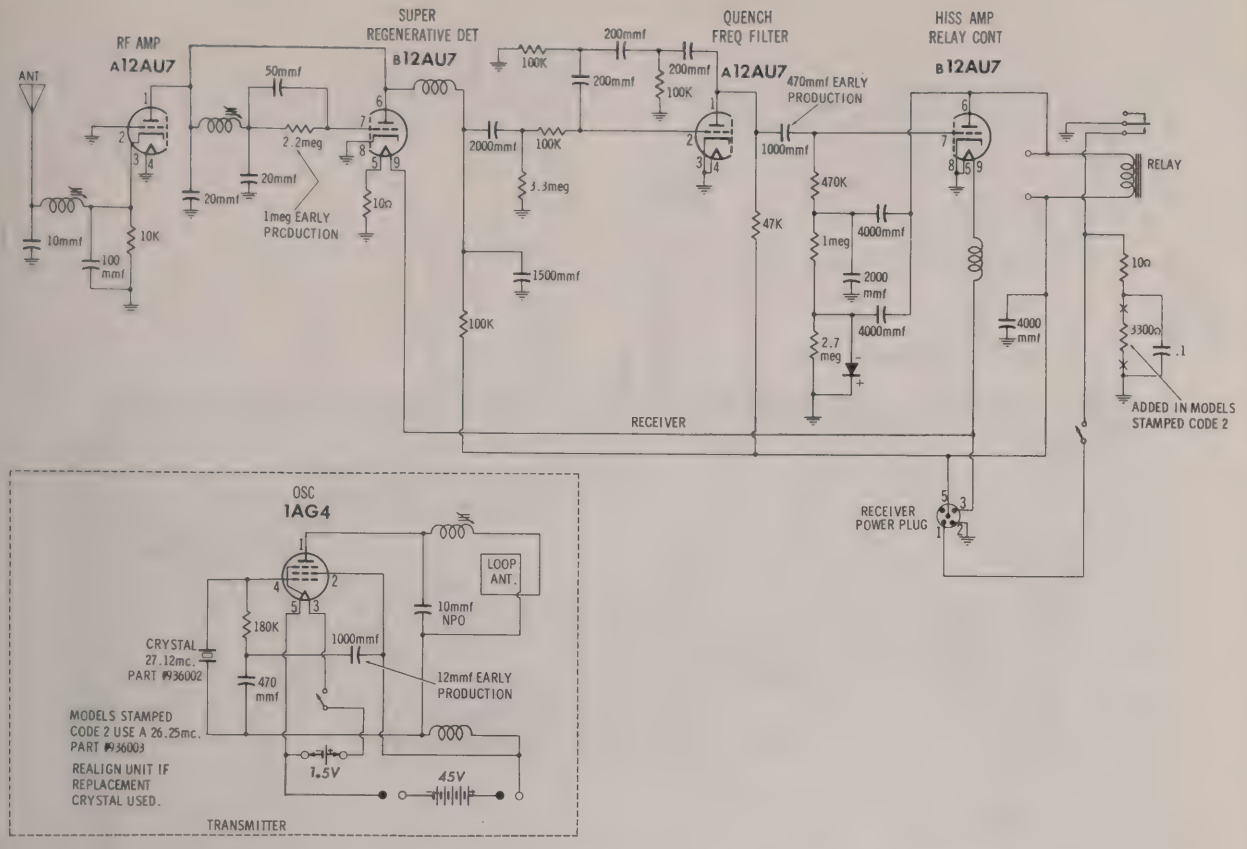
CABINETS & CABINET PARTS

(When Ordering Cabinets & Cabinet Parts, Specify Model, Chassis & Color)

NAME	PART NO.	DESCRIPTION
Safety Glass	430001	Models B1231, U, K1231, U, M1231, U, P1231, U, B1241, U, K1241, U, M1241, U, B1251, M1251, U, P1251, U, W1251, U, B3311, U, M3311, U, P3311, U, W3311, U, B3321, U, M3321, U, P3321, U, W3321, U
Safety Glass	430003	Models B3364, U, M3364, U, P3364, U
Mask	402001	Models B1231, U, K1231, U, M1231, U, P1231, U, B1241, U, K1241, U, M1241, U, B1251, M1251, U, P1251, U, W1251, U, B3311, U, M3311, U, P3311, U, W3311, U, B3321, U, M3321, U, P3321, U, W3321, U
Mask	402002	Models B3364, U, M3364, U, P3364, U
Knob	478001	VHF Channel Selector - Models B1231,U, K1231, U, M1231, U, P1231, U, B1241, U, K1241, U, M1241, U, B3311, M3311, U, P3311, U, W3311, U, B3364, U, M3364, U, P3364, U
Knob	480020	UHF 1st. Section
Knob	480013	UHF 2nd. Section
Knob	500005	VHF Fine Tuning - Models B1251, U, M1251, U, P1251, U, W1251, U, B3321, U, M3321, U, P3321, U, W3321, U
Knob	480027	UHF Fine Tuning
Knob	506004	VHF Pushbutton - Models B1251, U, M1251, U, P1251, U, W1251, U, B3321, U, M3321, U, P3321, U, W3321, U
Knob	508008	On-off-volume, brightness
Knob	512011	Contrast, vertical hold
Cabinet	344001	Model K1231, U
Cabinet	344002	Models M1231, U
Cabinet	344003	Models B1231, U
Cabinet	344004	Models P1231, U
Cabinet	346004	Models K1241, U
Cabinet	346008	Models M1241, U, M1251, U
Cabinet	346009	Models B1241, U, B1251, U
Cabinet	346010	Models P1251, U
Cabinet	346007	Model W1251, U
Cabinet	354011	Models M3311, U
Cabinet	354012	Models B3311, U
Cabinet	354013	Models P3311, U
Cabinet	354010	Model W3311, U
Cabinet	352004	Model M3321, U
Cabinet	352005	Models B3321, U
Cabinet	352006	Models P3321, U
Cabinet	352013	Models W3321, U
Cabinet	352025	Models M3364, U
Cabinet	352020	Models B3364, U
Cabinet	352024	Models P3364, U

WIRING DATA

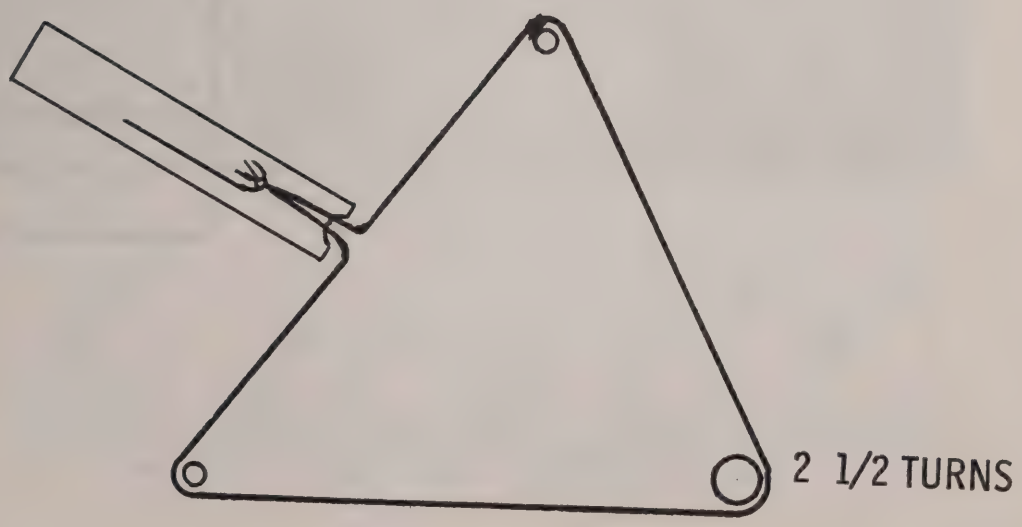
High Voltage Lead	Use BELDEN No. 8869
Shielded Hook-up Wire	Use BELDEN No. 8885 (Single Conductor) 8738 (Two Conductor)
General-use Unshielded Hook-up Wire	Use BELDEN No. 8530 (Solid) Available in Ten Colors 8524 (Stranded) Available in Ten Colors
Power Cord (Interlock Type)	Use BELDEN No. 8874
300Ω Tuner Input Lead	Use BELDEN No. 8225
300Ω Antenna Lead-in	Use BELDEN No. 8230 or 8275
Antenna Rotor Cable	Use BELDEN No. 8464 (Flat) or 8484 (Round) - 4 Conductor 8485 (Round) - 5 Conductor 8488 (Round) - 8 Conductor



RP-409 REMOTE CONTROL TRANSMITTER & RECEIVER USED IN SOME VERSIONS WITH DYNA-TOUCH TUNING

A PHOTOFACT STANDARD NOTATION SCHEMATIC
Howard W. Sams & Co., Inc. 1958

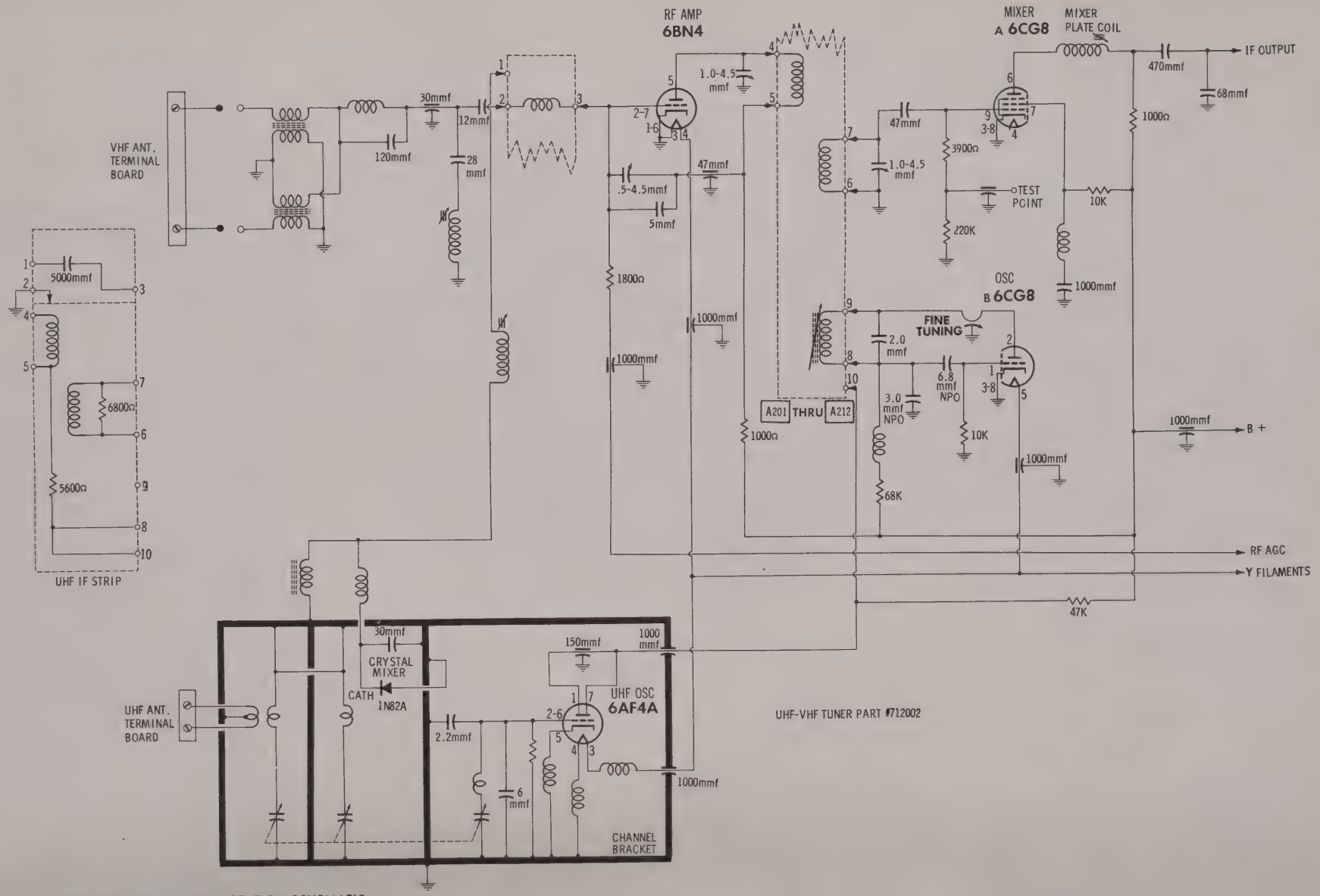
REMOTE CONTROL SCHEMATIC



UHF DRIVE CORD

HOFFMAN MODELS B1231, U, B1241, U, B1251, U, B3311, U, B3321, U, B3364, U, K1231, U, K1241, U, M1231, U, M1241, U, M1251, U, M3311, U, M3321, U, M3364, U, P1231, U, P1251, U, P3311, U, P3321, U, P3364, U, W1251, U, W3311, U, W3321, U (Ch. 332, U, 333)

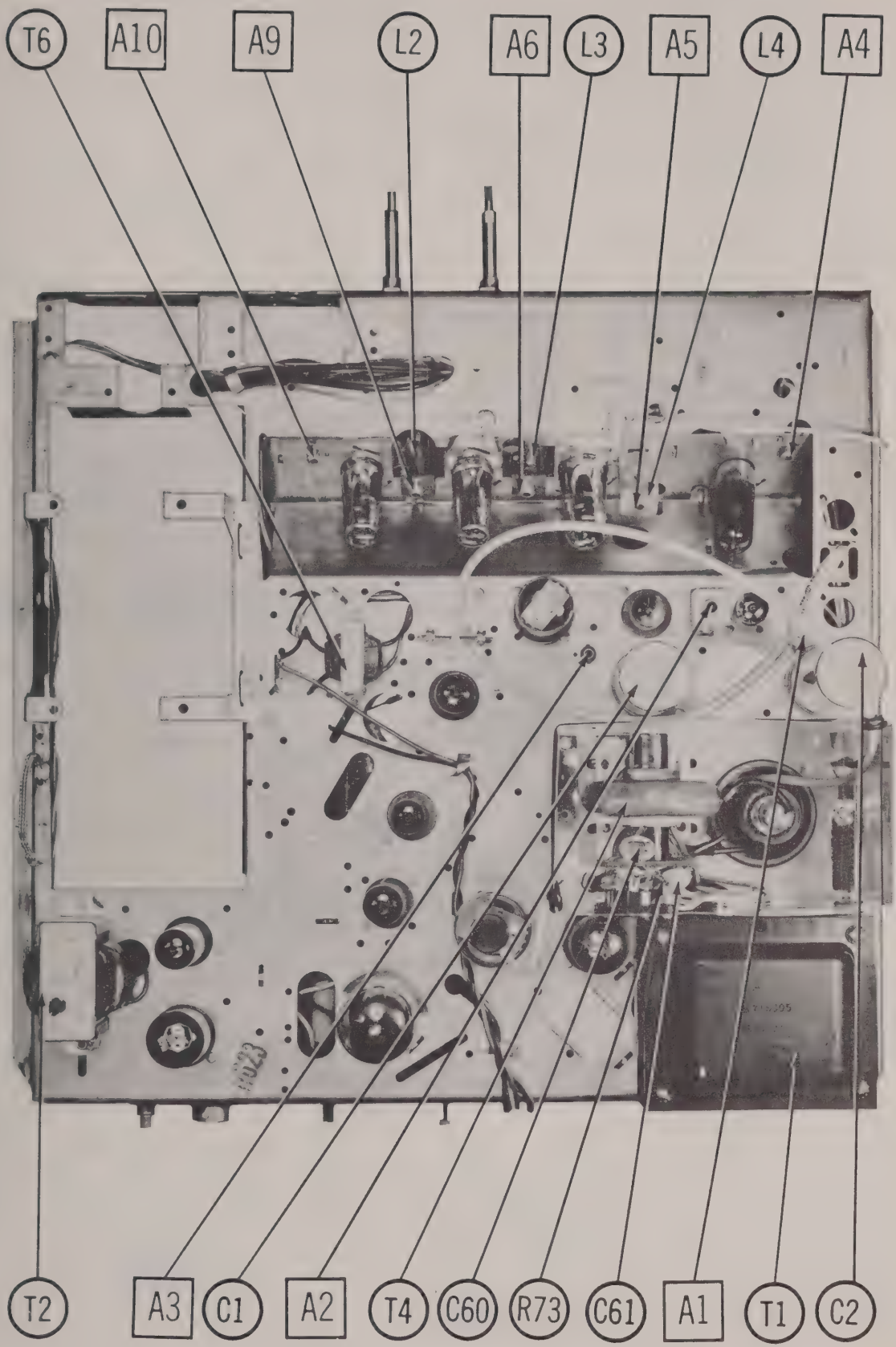
FOLDER 1



A PHOTOFACT STANDARD NOTATION SCHEMATIC

Howard W. Sams & Co., Inc. 1958

ALTERNATE TUNER SCHEMATIC

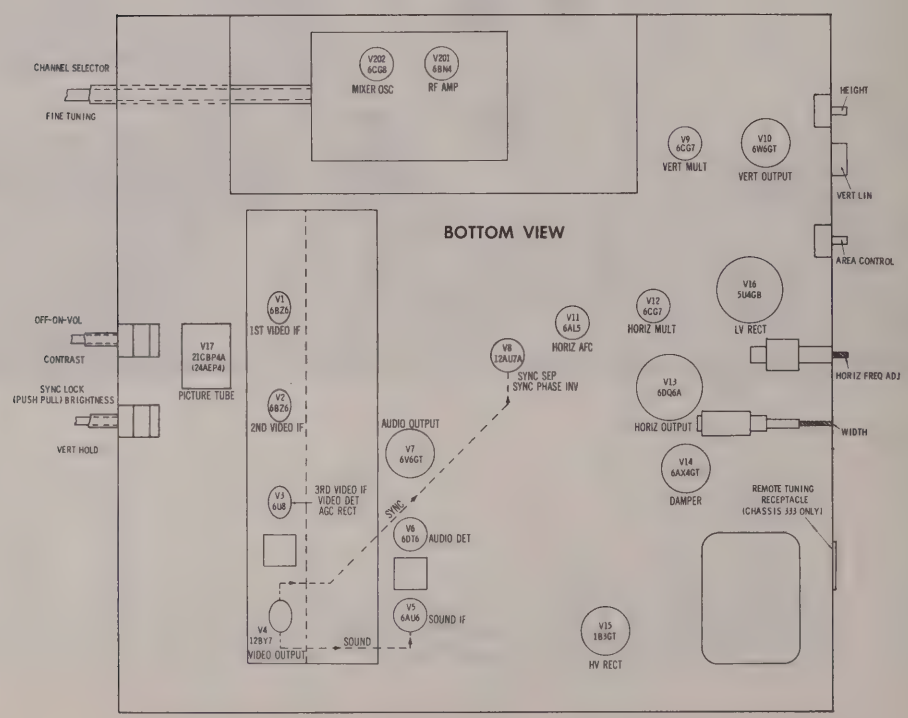


CHASSIS-TOP VIEW

RESISTANCE MEASUREMENTS

ITEM	TUBE	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Pin 9
V1	6BZ6	1.8meg	47Ω	.1Ω	0Ω	†3100Ω	†3100Ω	0Ω		
V2	6BZ6	1.8meg	47Ω	.1Ω	0Ω	†3100Ω	†3100Ω	0Ω		
V3	6U8	1.6meg	.1Ω	†3100Ω	.1Ω	0Ω	†3100Ω	180Ω	.1Ω	4700Ω
V4	12BY7	• 85Ω	4700Ω	• 85Ω	.1Ω	.1Ω	0Ω	†5800Ω	†2600Ω	• 85Ω
V5	6AU6	100K	0Ω	0Ω	.1Ω	†8200Ω	†47K	0Ω		
V6	6DT6	4.6Ω	820Ω	.1Ω	0Ω	†820K	†7000Ω	560K		
V7	6V6GT	NC	0Ω	†420Ω	†2600Ω	0Ω	NC	.1Ω	270Ω	
V8	12AU7A	†4500Ω	†470K	4500Ω	0Ω	0Ω	†470K	2.5meg	0Ω	.1Ω
V9	6CG7	ǂ 190K	4.7meg	1000Ω	0Ω	.1Ω	ǂ690K	• 1.7meg	1000Ω	0Ω
V10	6W6GT	TP	.1Ω	†570Ω	†670Ω	•1.1meg	TP	0Ω	•1200Ω	
V11	6AL5	15Ω	15Ω	.1Ω	0Ω	4.8meg	0Ω	4.8meg		
V12	6CG7	†8900Ω	5.1meg	1500Ω	0Ω	.1Ω	†83K	100K	1500Ω	0Ω
V13	6DQ6A	TP	.1Ω	NC	†12K	390K	NC	0Ω	0Ω	TOP CAP ǂ8Ω
V14	6AX4GT	NC	NC	¶	NC	†120Ω	NC	0Ω	.1Ω	
V15	1B3GT	PINS 1 THRU 8 HAVE INFINITE RESISTANCE								TOP CAP ǂ338Ω
V16	5U4GB	NC	¶	NC	16Ω	TP	17Ω	NC	¶	
V17	21CBP4A	0Ω	22K	PIN 6 ǂ10K	PIN 10 ǂ10K	PIN 11 • 300K	PIN 12 .1Ω			
V201	6BN4	0Ω	1.8meg	0Ω	.1Ω	†3600Ω	0Ω	1.8meg		
V202	6CG8	10K	†9400Ω	0Ω	0Ω	.1Ω	†3600Ω	†14K	0Ω	225K

¶ THIS READING CAN VARY GREATLY, (10K MINIMUM), DUE TO THE CONDITION OF THE ELECTROLYTIC CAPACITOR CONNECTED IN THE ASSOCIATED CIRCUIT.
• THIS READING WILL VARY. CONTROL SET FOR NORMAL OPERATION.
† MEASURED FROM 300V SOURCE.
ǂ MEASURED FROM PIN 3 OF V14.
NC NO CONNECTION.
TP TIE POINT.



TUBE PLACEMENT CHART

PROPERTY OF
L. F. BLANKENSHIP
3924 MEADE ST.
DENVER, COLORADO

PHOTOFACT* Folder

MOTOROLA CHASSIS TS-544, TS-544Y, WTS-544, WTS-544Y

MOTOROLA CHASSIS TS-544, TS-544Y, WTS-544, WTS-544Y

DISASSEMBLY INSTRUCTIONS

CHASSIS REMOVAL

1. Remove the on-off-volume and contrast knobs.

2. Remove the trim covering the channel selector and fine tuning knobs by prying it off. Remove these knobs.

3. Remove 3 screws holding the side trim panel. Remove 3 knobs now accessible.

4. Remove 8 wood screws from the rear cover. Remove the rear cover.

5. Remove the speaker leads, control plug, and remote receiver plug.

6. Remove 2 screws from the top chassis support bracket.

7. Remove 4 chassis bolts from the bottom.

8. Remove the chassis.

9. Remove 2 hex nuts from the front holding the controls. Remove 2 screws from the inside of the cabinet holding the control panel. Remove the control panel.

10. Remove 2 screws and 2 bolts holding the remote receiver. Remove the remote receiver chassis.

MODEL 21K80CWA (CH. TS-544)

PROPERTY OF
L. F. BLANKENSHIP
3924 MEADE ST.
DENVER, COLORADO

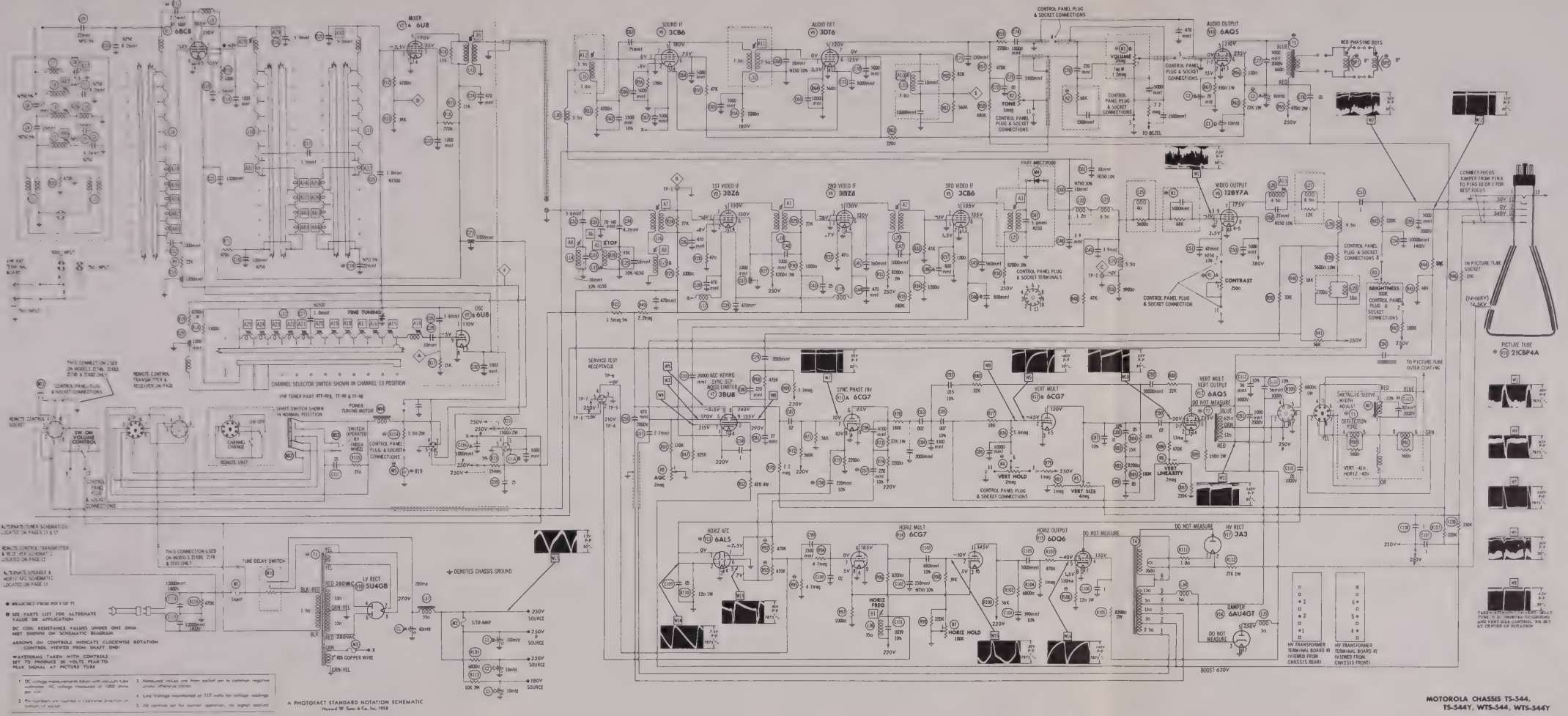
TRADE NAME	Motorola	MODELS	CHASSIS
		21F8B, BA, W, WA, 21K73B, M, 21K75B, CW, M, 21K76B, CW, M, 21K77B, M, 21K80CW, CWA, 21T40BG, MG, 21T42B, M, 21V1W, WA	TS-544
		Y21F8B, BA, W, WA, Y21K73B, BA, M, MA, Y21K75B, BA, CW, CWA, M, MA, Y21K76B, BA, CW, CWA, M, MA, Y21K77B, M, Y21K80CW, CWA, Y21T40BG, BGA, MG, MGA, Y21T42B, BA, M, MA, Y21V1W, WA	TS-544Y
		21K81B, M	WTS-544
		Y21K81B, M	WTS-544Y
		Remote Control Receiver ..... Model TR-89R	
		Remote Control Transmitter ..... Model TR-89T	
MANUFACTURER	Motorola, Inc., 4545 W. Augusta Blvd., Chicago 51, Illinois		
TYPE SET	Television Receiver with Remote Control		
TUBES	TV - Nineteen, Remote Control - Four, One Transistor		
POWER SUPPLY	TV & Remote Control Receiver 110-120 Volts AC, 60 Cycles RATING 225 Watts, 2 Amp. @117 Volts AC Remote Control Transmitter 22.5 Volt "A" Supply		
TUNING RANGE	TV Channels 2 thru 13 VHF, 14 thru 83 UHF, Video IF 45.75MC, Sound IF 41.25MC (Intercarrier) Remote Control 38.5KC & 41.25KC		

SOME MODELS USE MOTOROLA RECORD CHANGER #VM13RC. FOR SERVICE INFORMATION SEE SIMILAR UNIT IN PHOTOFACT SET 353 — FOLDER 16.

FOR "SERVICING IN THE FIELD" SEE PAGE 28.

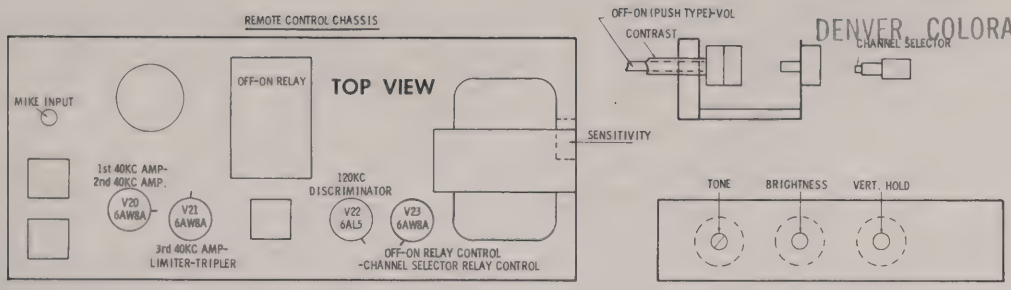
HOWARD W. SAMS & CO., INC. • Indianapolis 5, Indiana

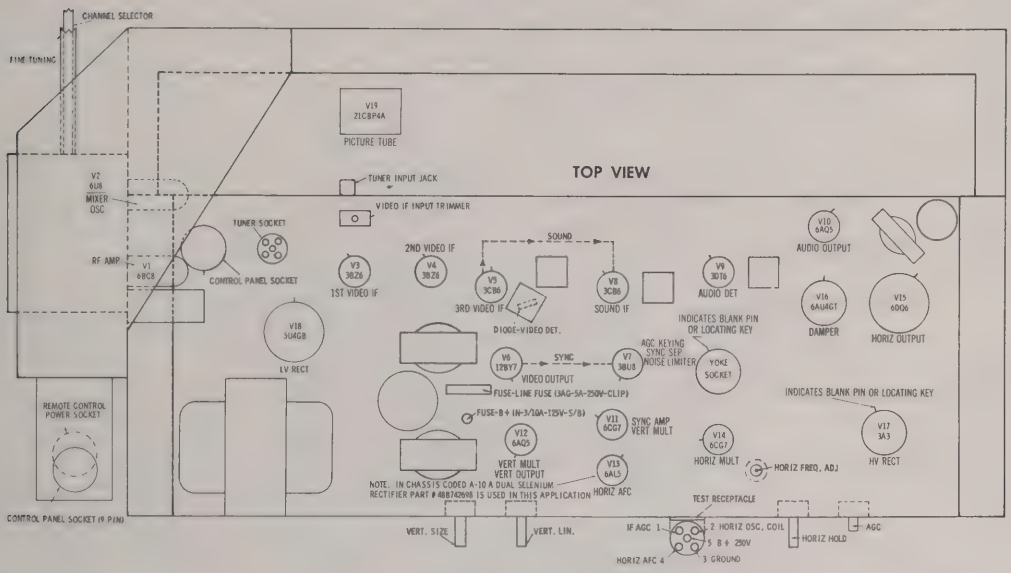
The listing of any available replacement part herein does not constitute in any case a recommendation, warranty or guaranty by Howard W. Sams & Co., Inc., as to the quality and suitability of such replacement part. The numbers of these parts have been compiled from information furnished to Howard W. Sams & Co., Inc., by the manufacturers of the particular type of replacement part listed. Reproduction or use, without express permission, of editorial or pictorial content, in any manner, is prohibited. No patent liability is assumed with respect to the use of the information contained herein. © 1958 Howard W. Sams & Co., Inc., Indianapolis 5, Indiana. Printed in U.S. of America


MOTOROLA CHASSIS TS-544,
TS-544Y, WTS-544, WTS-544Y
A PHOTOFACT STANDARD NOTATION SCHEMATIC
Howard W. Sams & Co., Inc. 1958
DENOTES CHASSIS GROUND
MIXER V7 A 6U8
SOUND IF V8 3CB6
AUDIO DET V9 3DT6
AUDIO OUTPUT V10 6AQ5
1ST VIDEO IF V5 3BZ6
2ND VIDEO IF V4 3BZ6
3RD VIDEO IF V3 3CB6
VIDEO OUTPUT V6 12BY7A
OSC V2 A 6U8
SYNC SEP NOISE LIMITER V7 3BU8
SYNC PHASE INV V11 A 6CG7
VERT MULT V11 B 6CG7
VERT MULT VERT OUTPUT V17 6AQ5
HORIZ AFC V13 6AL5
HORIZ MULT V14 6CG7
HORIZ OUTPUT V15 6DQ6
HV RECT V17 3A3
DAMPER V16 6AU4GT
LV RECT V18 5U4GB
PICTURE TUBE V19 21CBP4A
CONTROL PANEL PLUG & SOCKET CONNECTIONS
CONTROL PANEL PLUG & SOCKET TERMINALS
CONTROL PANEL PLUG & SOCKET CONNECTION
VOLUME
TONE
CONTRAST
BRIGHTNESS
FINE TUNING
CHANNEL SELECTOR SWITCH SHOWN IN CHANNEL 13 POSITION
REMOTE CONTROL TRANSMITTER & RECEIVER ON PAGE
SHAFT SWITCH SHOWN IN NORMAL POSITION
POWER TUNING MOTOR
SWITCH OPERATED BY INDEX WHEEL
REMOTE UNIT
SW ON VOLUME CONTROL
ON OFF
CHANNEL CHANGE
TIME DELAY SWITCH
SAMP
1/10 AMP
SERVICE TEST RECEPTACLE
AGC
VERT HOLD
VERT SIZE
VERT LINEARITY
HORIZ FREQ
HORIZ HOLD
DO NOT MEASURE
BOOST 630V
RED PHASING DOTS
CONNECT FOCUS JUMPER FROM PIN 6 TO PINS 10 OR 1 FOR BEST FOCUS
TO PICTURE TUBE OUTER COATING
TO BEZEL
IN PICTURE TUBE SOCKET
DEFLECTION YOKE
METALLIC SLEEVE WIDTH ADJUST
VERT -40
HORIZ +20
HV TRANSFORMER TERMINAL BOARD #1 (VIEWED FROM CHASSIS REAR)
HV TRANSFORMER TERMINAL BOARD #2 (VIEWED FROM CHASSIS FRONT)
ALTERNATE TUNER SCHEMATIC LOCATED ON PAGES 13 & 17
REMOTE CONTROL TRANSMITTER & REMOTE VER SCHEMATIC LOCATED ON PAGE 12
ALTERNATE SPEAKER & HORIZ AFC SCHEMATIC LOCATED ON PAGE 13
SELECTED FROM PCF 1 OF T1
SEE PARTS LIST FOR ALTERNATE VALUE OR APPLICATION
DC COIL RESISTANCE VALUES UNDER ONE OHM NOT SHOWN ON SCHEMATIC DIAGRAM
ARROWS ON CONTROLS INDICATE CLOCKWISE ROTATION CONTROL VIEWED FROM SHAFT END
WAVEFORMS TAKEN WITH CONTROLS SET TO PRODUCE 50 VOLTS PEAK-TO-PEAK SIGNAL AT PICTURE TUBE
1 DC voltage measurements taken with vacuum tube voltmeter AC voltage measured at 1000 ohms per volt
2 Pin numbers are counted in clockwise direction on bottom of socket
3 Measured values are from socket pin to common negative unless otherwise stated
4 Line Voltage maintained at 117 volts for voltage readings
5 All controls set for normal operation, no signal applied

TUBE PLACEMENT CHART

PROPERTY OF
L. F. BLANKENSHIP
3924 MEADE ST.
DENVER, COLORADO





TUBE FAILURE CHECK CHART

The following chart lists tubes whose failures are most likely to produce the indicated symptoms. Refer to tube placement chart for location and type of tube.

POWER SUPPLY FAILURE
No raster, no sound - **Fuse (M1, M2, M3), Delay Switch (M10), V18**

LOSS OF PICTURE OR SOUND
No pic, no sound, has raster - **V3, V4, V5, Diode (M4)**
No pic, no sound, has snow - **V1, V2, V3**
No pic, has sound, has raster - **V6, V19**
Has pic, no sound - **V8, V9, V10**
Overloaded picture - **V7**

SYNC FAILURE
No vert. sync - **V7, V11**
No horiz. sync - **V7, V11, V13**
No vert. or horiz. sync - **V7, V11**

SWEEP FAILURE
No raster, has sound - **V13, V14, V15, V16, V17, V19**
No vertical deflection - **V11, V12**
Poor vert. linearity or foldover - **V11, V12**
Poor horiz. linearity or foldover - **V14, V15, V16**
Narrow picture - **V14, V15, V16, V18**
Vert. off freq. - **V11, V12**
Horiz. off freq. - **V14**

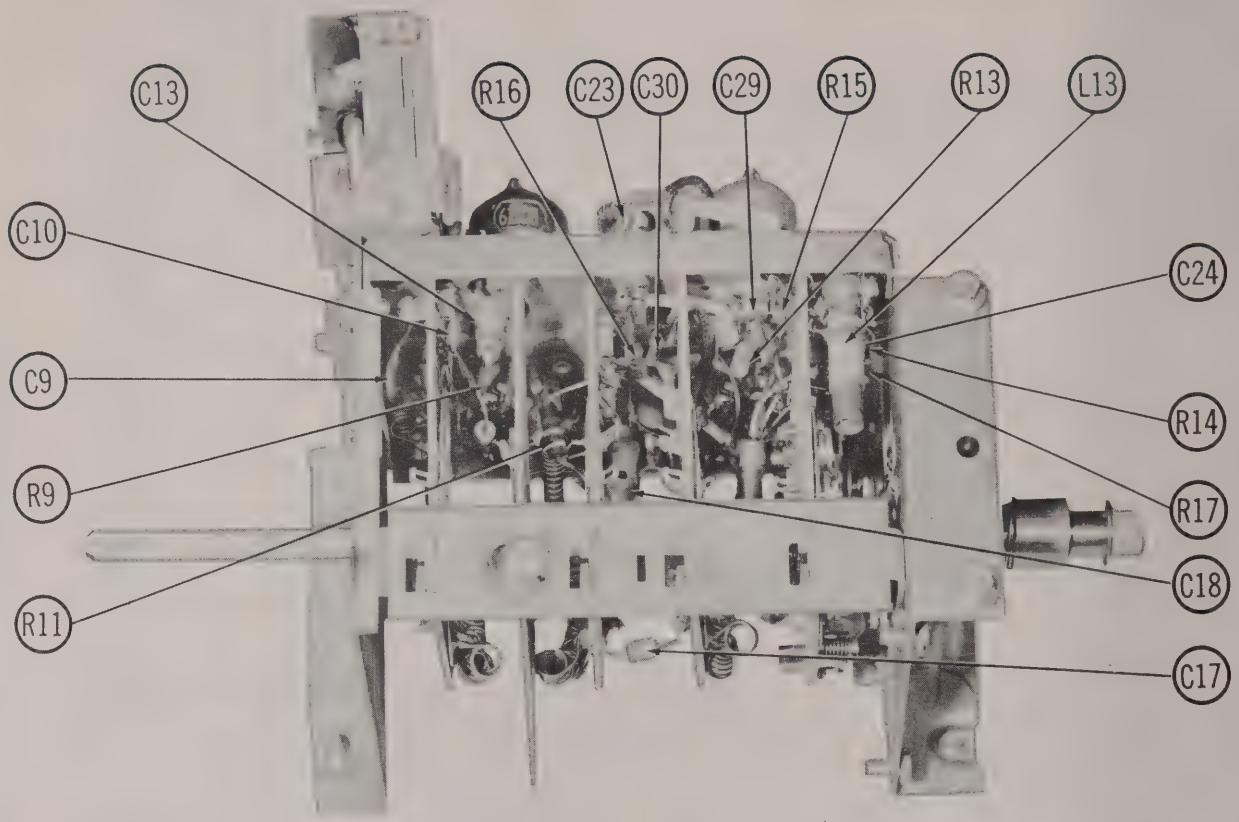
CHASSIS BOTTOM VIEW-RESISTOR AND INDUCTOR IDENTIFICATION

PROPERTY OF
L. F. BLANKENSHIP
3924 MEADE ST.
DENVER, COLORADO

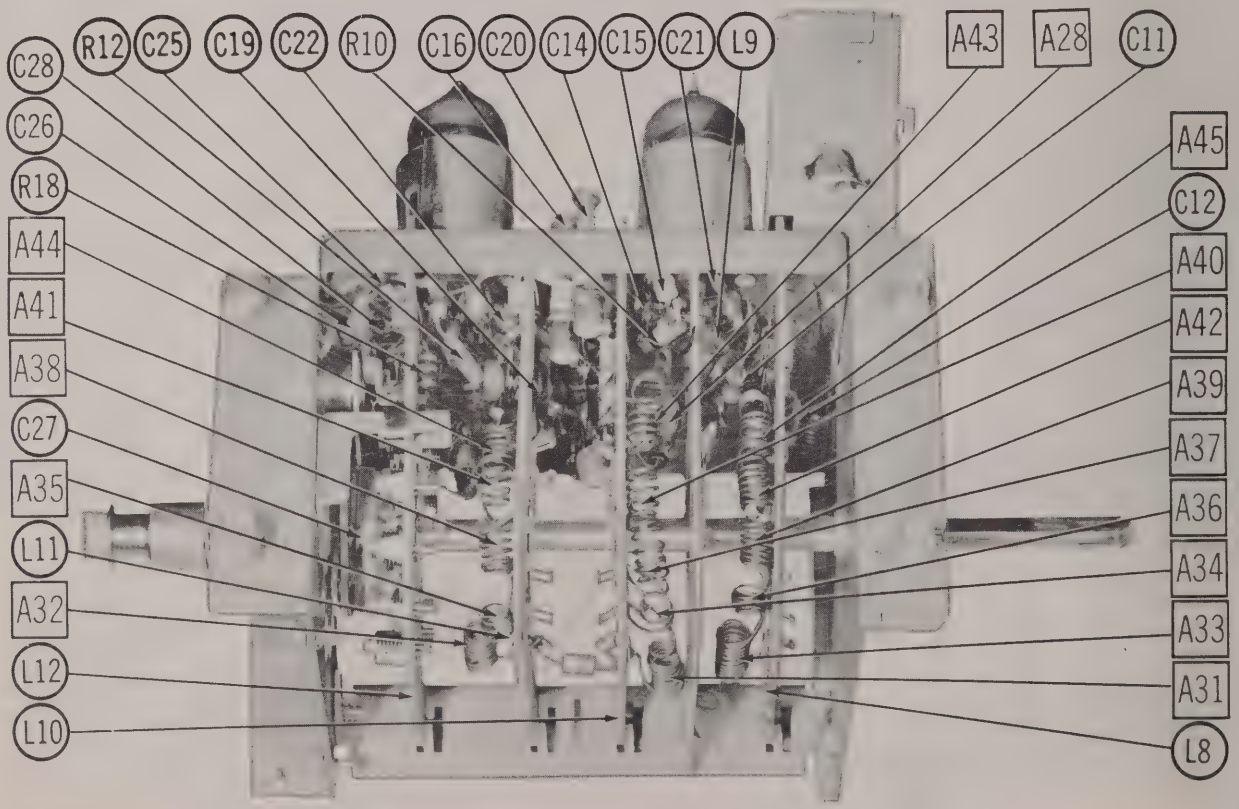
CHASSIS BOTTOM VIEW-CAPACITOR AND ALIGNMENT IDENTIFICATION

MOTOROLA CHASSIS TS-544,
TS-544Y, WTS-544Y

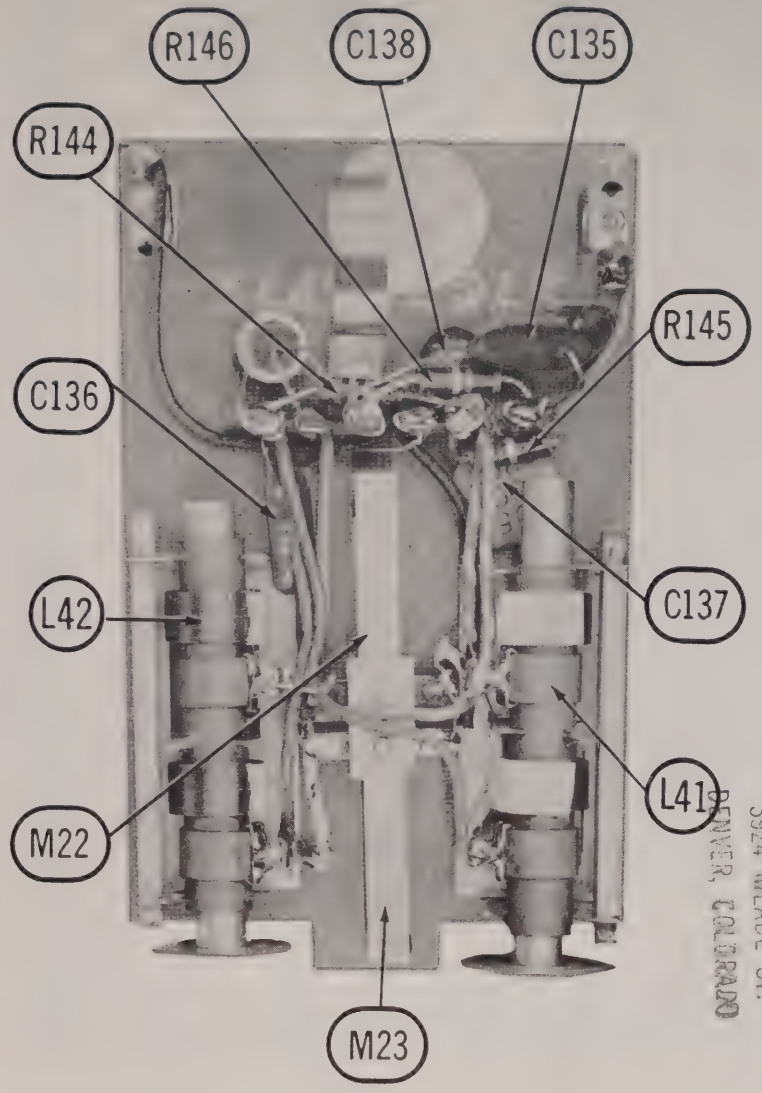
FOLDER 2



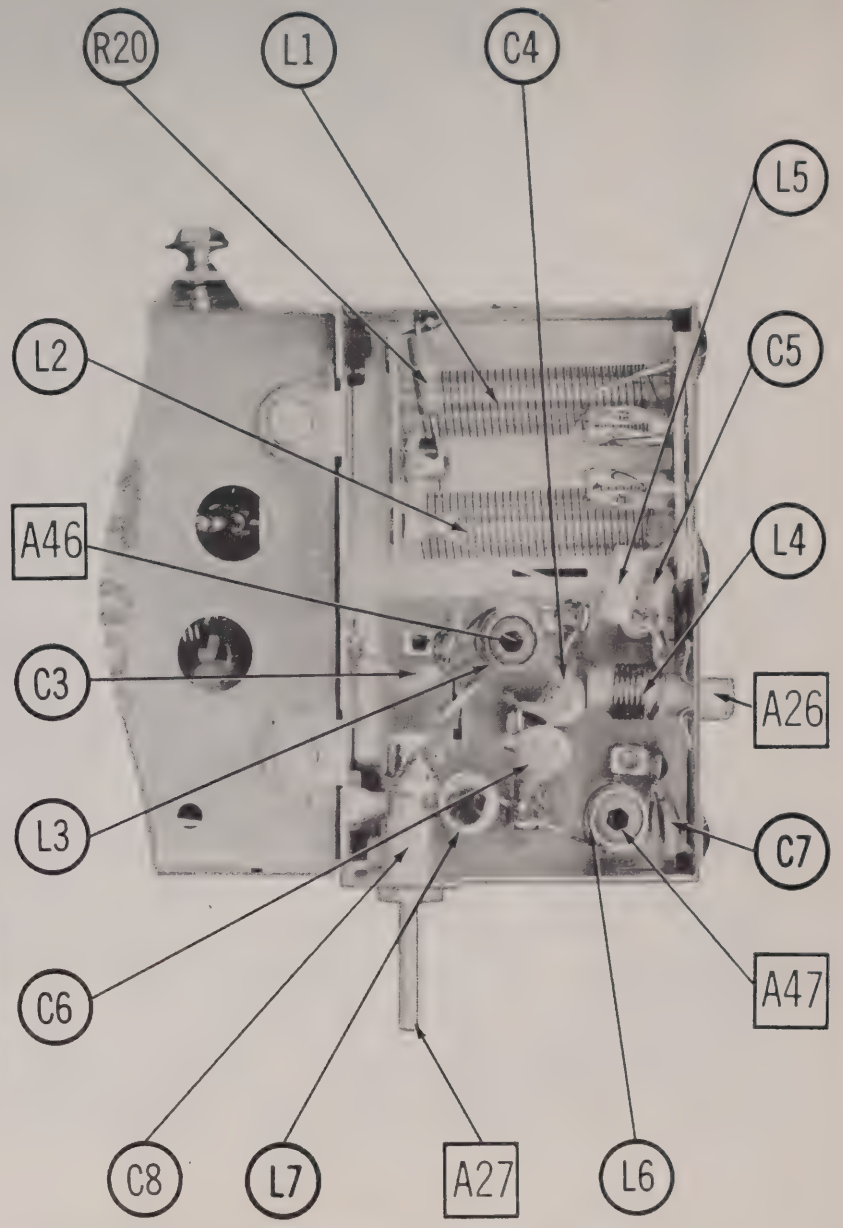
TUNER-LEFT SIDE



TUNER-RIGHT SIDE



REMOTE TRANSMITTER



RF TUNER - REAR VIEW

PROPERTY OF
L. F. BLANKENSHIP
3924 MEADE St.
DENVER, COLORADO

RESISTANCE MEASUREMENTS

ITEM	TUBE	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Pin 9
V1	6CB8	†2000Ω	INF	INF	0Ω	.1Ω	INF	4meg	0Ω	0Ω
V2	6U8	†13K	44K	†280K	0Ω	.1Ω	†28K	0Ω	0Ω	15K
V3	3BZ6	680K	47Ω	.1Ω	.2Ω	†8200Ω	†8200Ω	0Ω		
V4	3BZ6	680K	47Ω	0Ω	.2Ω	†8200Ω	†8200Ω	0Ω		
V5	3CB6	1100Ω	120Ω	.1Ω	0Ω	†8200Ω	†8200Ω	0Ω		
V6	12BY7A	• 160Ω	72K	0Ω	.1Ω	.1Ω	0Ω	†5600Ω	†10K	0Ω
V7	3BU8	†6800Ω	‡47K	2.4meg	.1Ω	.2Ω	†38K	‡870K	‡2.4meg	†3.8meg
V8	3CB6	4700Ω	150Ω	.1Ω	.2Ω	†11K	†70K	0Ω		
V9	3DT6	7.5Ω	560Ω	.2Ω	0Ω	‡1.3meg	†22K	560K		
V10	6AQ5	0Ω	330Ω	.1Ω	0Ω	†1100Ω	†570Ω	0Ω		
V11	6CG7	• ‡2meg	1.2meg	0Ω	0Ω	.1Ω	†35K	56K	2200Ω	0Ω
V12	6AQ5	• 1.1meg	0Ω	0Ω	.1Ω	†625Ω	†150Ω	• 1.1meg		
V13	6AL5	12Ω	12Ω	0Ω	.1Ω	5.2meg	0Ω	5.2meg		
V14	6CG7	†63K	• 70K	1000Ω	0Ω	.1Ω	†15K	9.5meg	1000Ω	0Ω
V15	6DQ6	TP	0Ω	NC	†8200Ω	1meg	TP	.1Ω	12Ω	TOP CAP ‡18Ω
V16	6AU4GT	NC	TP	¶	NC	†5Ω	TP	.1Ω	0Ω	
V17	3A3		PINS	1 THRU 8	HAVE	INFINITE	RESISTANCE			TOP CAP ‡278Ω
V18	5U4GB	NC	¶	NC	10Ω	NC	10Ω	NC	¶	
V19	21CBP4A	0Ω	78K	PIN 6 ‡330K	PIN 10 ‡330K	PIN 11 • 220K	PIN 12 .1Ω			
V20	6AW8A	1200Ω	45Ω	††190K	.1Ω	0Ω	82Ω	2.2meg	††100K	††9000Ω
V21	6AW8A	82Ω	2.2meg	††185K	.1Ω	0Ω	470Ω	470K	††38K	††4900Ω
V22	6AL5	2.2meg	4.4meg	0Ω	.1Ω	2.2meg	0Ω	4.4meg		
V23	6AW8A	0Ω	2.8meg	††4400Ω	0Ω	.1Ω	0Ω	2.8meg	††8200Ω	††5200Ω
X1	Transistor Type 2N270	RESISTANCE MEASUREMENTS NOT GIVEN BECAUSE OF WIDE VARIATION IN INTERNAL TRANSISTOR RESISTANCE.								

¶ THIS READING CAN VARY GREATLY, (10K MINIMUM), DUE TO THE CONDITION OF THE ELECTROLYTIC CAPACITOR CONNECTED IN THE ASSOCIATED CIRCUIT.

• THIS READING WILL VARY. CONTROL SET FOR NORMAL OPERATION.

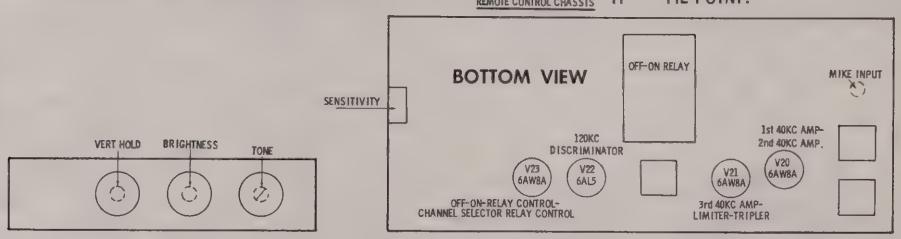
† MEASURED FROM 250V SOURCE.

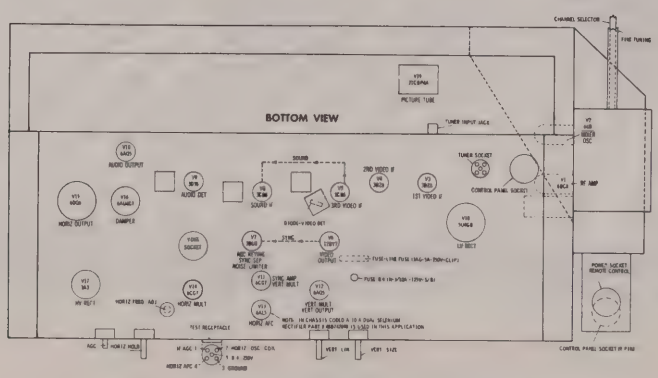
‡ MEASURED FROM PIN 3 OF V16.

†† MEASURED FROM 400V SOURCE.

NC NO CONNECTION.

TP TIE POINT.





TUBE PLACEMENT CHART

PROPERTY OF
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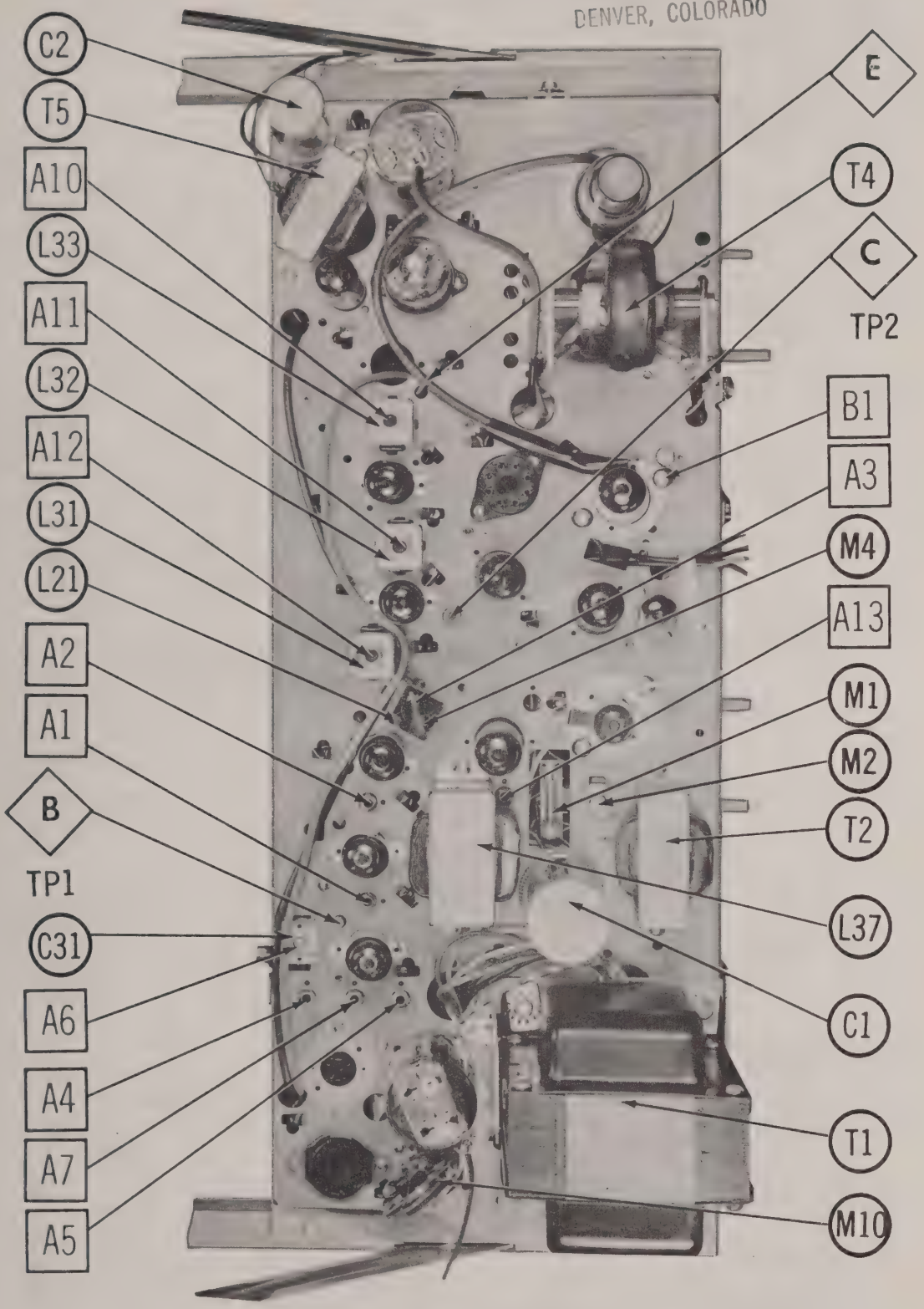
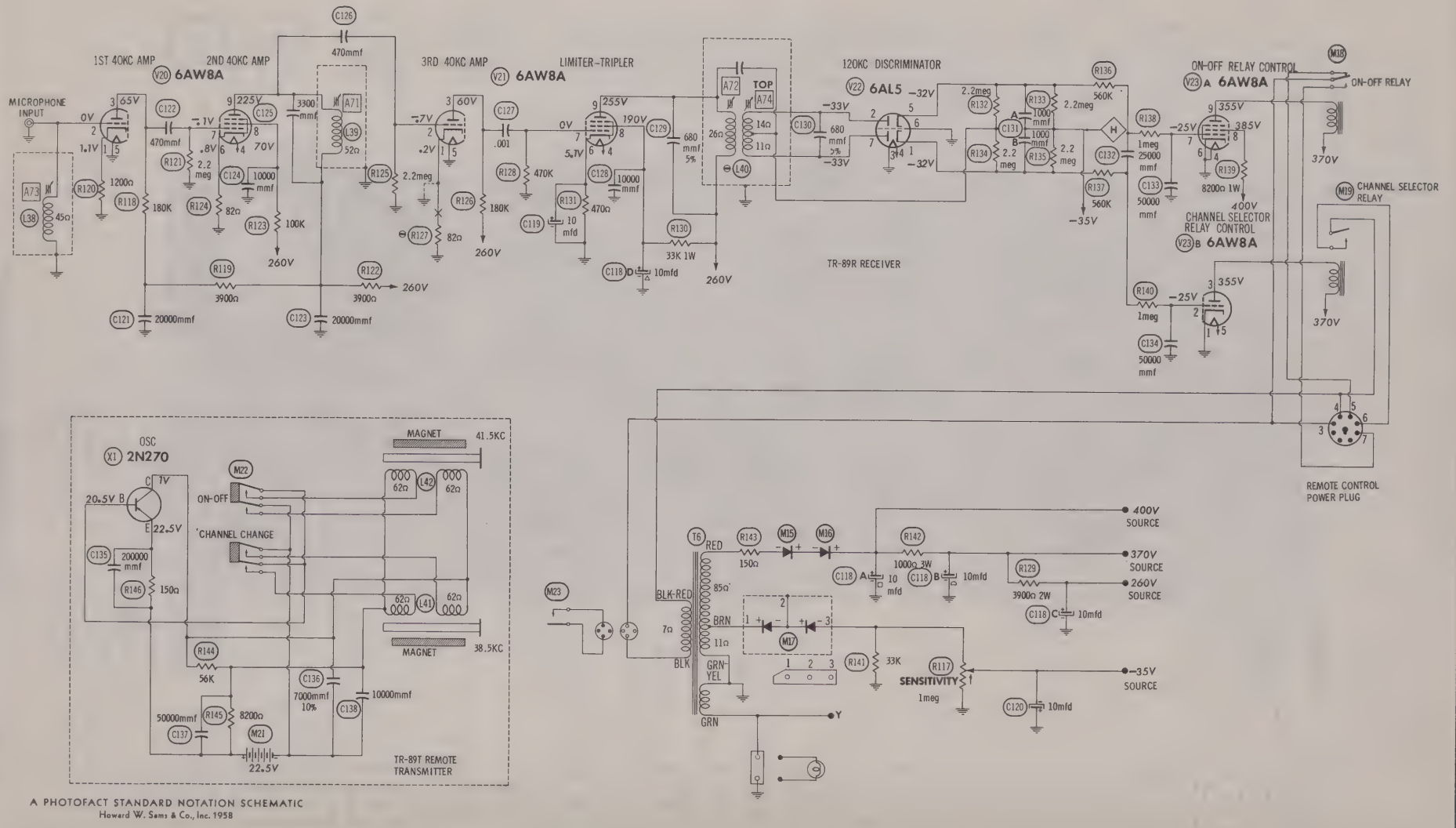
3924 MEADE ST.
DENVER, COLORADO



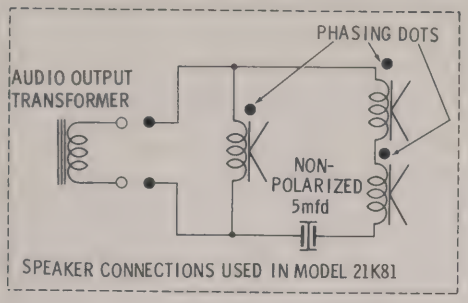
CHASSIS TOP VIEW

SET 393 FOLDER 2

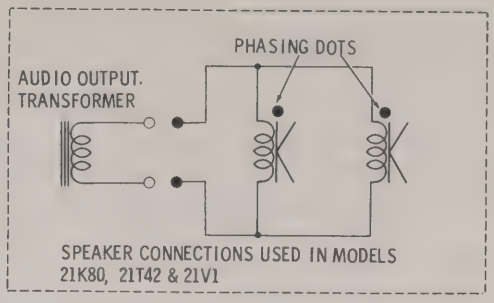


A PHOTOFACT STANDARD NOTATION SCHEMATIC
Howard W. Sams & Co., Inc. 1958

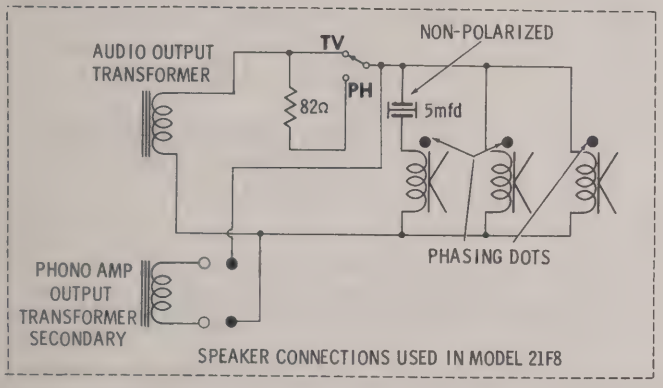
REMOTE CONTROL SCHEMATIC



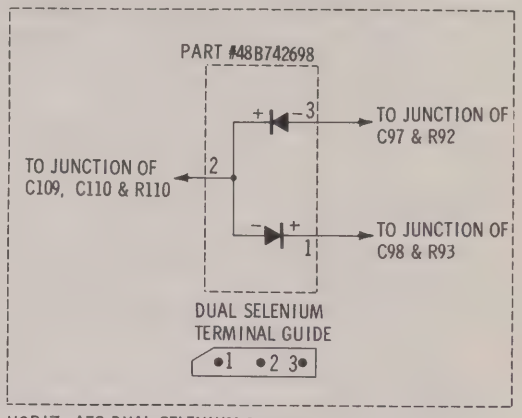
SPEAKER CONNECTIONS USED IN MODEL 21K81



SPEAKER CONNECTIONS USED IN MODELS 21K80, 21T42 & 21V1



SPEAKER CONNECTIONS USED IN MODEL 21F8


PART #48B742698
TO JUNCTION OF C97 & R92
TO JUNCTION OF C109, C110 & R110
TO JUNCTION OF C98 & R93
DUAL SELENIUM TERMINAL GUIDE
•1 •2 3•
HORIZ. AFC DUAL SELENIUM DIODE USED IN LIEU OF 6AL5 (V13) IN SOME VERSIONS

A PHOTOFACT STANDARD NOTATION SCHEMATIC
Howard W. Sams & Co., Inc. 1958

ALTERNATE SPEAKER & HORIZ AFC SCHEMATIC

PROPERTY OF
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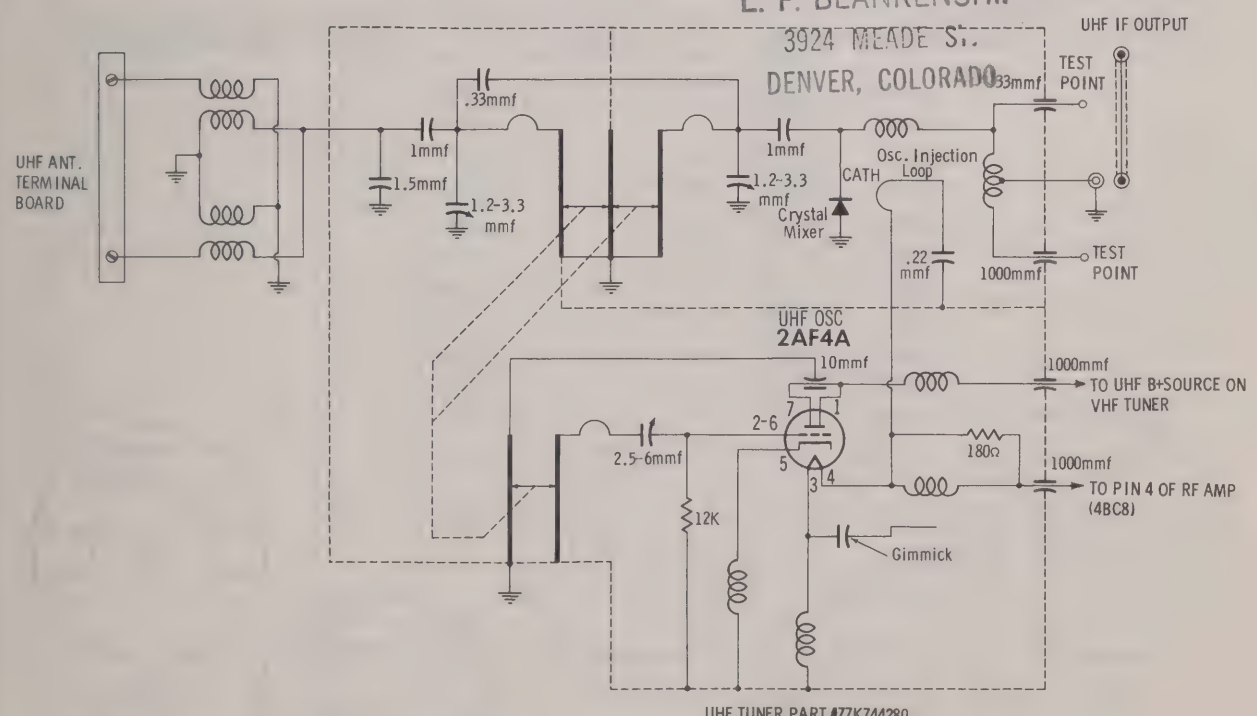
3924 MEADE ST.
DENVER, COLORADO



UHF TUNER PART #77K744280

A PHOTOFACT STANDARD NOTATION SCHEMATIC
Howard W. Sams & Co., Inc. 1958

ALTERNATE UHF TUNER SCHEMATIC

ALIGNMENT INSTRUCTIONS

PRE-ALIGNMENT INSTRUCTIONS

Allow a 20 minute warm-up period for the receiver and test equipment.
Remove the deflection yoke plug and connect a 2000Ω 50 watt resistor from TP5 to TP7.

VIDEO IF ALIGNMENT

Disable the local oscillator by connecting a short clip lead from point Ⓐ to chassis. Connect the negative lead of a 6 volt bias supply to TP3. Positive to chassis.
Connect the synchronized sweep voltage from the sweep generator to the horizontal input of the oscilloscope for horizontal deflection.
Use only enough sweep generator output to provide a usable pattern on scope.
All slugs should be tuned away from the chassis except A3, A4 and A5 which are tuned toward the chassis.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
1.	.001mfd	High side to point Ⓑ. Low side to chassis.	44MC (10MC Swp)	42.25MC 45.75MC	13	Vert. Amp. thru 47K to point Ⓒ. Low side to chassis.	A1, A2, A3	Adjust A1 to place 42.25MC at 70%, A2 to place 45.75MC at 80% and A3 for flat-topped response curve. (See Fig. 1.).
2.	"	High side to point Ⓓ. Low side to chassis.	"	40.0MC 42.25MC 45.75MC 47.25MC	"	"	A4, A5, A6, A7, A8	Preset A9 fully counter clockwise. Adjust A4 thru A8 for response similar to Fig. 2. Adjust A4 to place 47.25MC marker in trap notch. A5 to place 40.0MC marker in other trap notch. (It may be necessary to remove bias). Adjust A6, A7 and A8 alternately for correct curve and marker positions.
3.	"	"	"	42.25MC 45.75MC	"	"	A9	Adjust for maximum gain and symmetry of response similar to Fig. 3 with markers as shown. Remove the 2000Ω resistor and plug the yoke in.

SOUND IF ALIGNMENT

Tune in a strong TV station and adjust the controls for normal picture and sound.
Connect the DC probe of a VTVM to point Ⓔ. Common to chassis. Adjust A10 for maximum deflection. Remove the VTVM and retouch A10 for maximum undistorted sound.
Reduce the signal strength (by either disconnecting the antenna lead or connecting an attenuator in series with the antenna lead) until a hiss similar to super-regeneration is heard in the sound. Adjust A11 and A12 for maximum undistorted sound. If necessary, repeat entire procedure.

4.5MC TRAP ALIGNMENT

Tune in a local TV station and adjust the fine tuning until the 4.5MC beat interference in prominent in the picture with the contrast control advanced. Starting with A13 fully counter clockwise, rotate slug clockwise past first point of strongest beat pattern. Adjust for MINIMUM beat pattern between first and second point of strong beat.

VHF OSCILLATOR ALIGNMENT

The tuner cover must be in place.
Connect the synchronized sweep voltage from the sweep generator to the horizontal input of the oscilloscope for horizontal deflection.
The sweep generator output lead should be terminated with its characteristic impedance, usually 50 ohms.
Set the fine tuning to the center of its range.
Use only enough sweep generator output to provide a usable pattern on scope.
Connect bias as under "Video IF Alignment".
Use 10MC sweep unless otherwise noted.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
4.	Two 120Ω Carbon Resistors	Across antenna terminals with 120Ω in each lead.	213MC	211.25MC 215.75MC	13	Vert. Amp. thru 47K to point Ⓒ. Low side to chassis.	A14	Adjust to place sound marker in trap notch as in Fig. 4. Video marker should fall at 50%.
			207MC	205.25MC 209.75MC	12		A15	
			201MC	199.25MC 203.75MC	11		A16	
			195MC	193.25MC 197.75MC	10		A17	
			189MC	187.25MC 191.75MC	9		A18	
			183MC	181.25MC 185.75MC	8		A19	
			177MC	175.25MC 179.75MC	7		A20	
			85MC	83.25MC 87.75MC	6		A21	
			79MC	77.25MC 81.75MC	5		A22	
			69MC	67.25MC 71.75MC	4		A23	
			63MC	61.25MC 65.75MC	3		A24	
			57MC	55.25MC 59.75MC	2		A25	

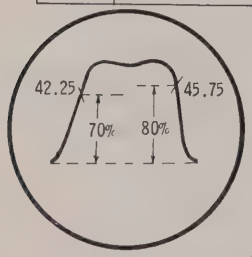


FIG.1

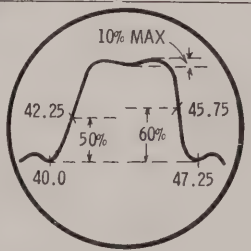


FIG.2

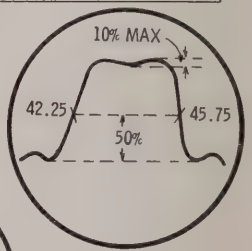


FIG.3

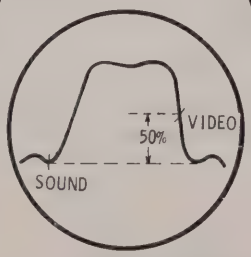


FIG.4

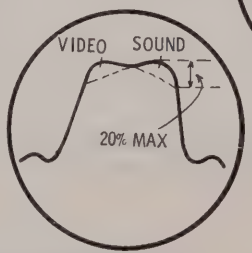


FIG.5

ALIGNMENT INSTRUCTIONS (cont)

VHF RF AND MIXER ALIGNMENT FOR TUNERS #TT-98, TT-98Y, TT-99, TT-99B, TT-99Y AND VTT-99Y

Short tuner AGC to ground by connecting a clip lead from point (F) to chassis.
Remove the tuner cover.
Connect the synchronized sweep voltage from the sweep generator to the horizontal input of the oscilloscope for horizontal deflection.
The sweep generator output lead should be terminated with its characteristic impedance, usually 50 ohms.
Use only enough sweep generator output to provide a usable pattern on scope.
Use 10MC sweep unless otherwise noted.
Coils not containing adjustable cores are adjusted by expanding or compressing coil turns.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
5.	Two 120Ω Carbon Resistors	Across antenna terminals with 120Ω in each lead.	Not used	159.0MC (400∿ 30% AM Mod)	7	Vert. Amp. thru 47K to point (C). Low side to chassis.	A26	Adjust for MINIMUM 400∿ indication on scope.
6.	"	"	"	112.0MC (400∿ 30% AM Mod)	6	"	A27	"
7.	"	"	213MC	211.25MC 215.75MC	13	Vert. Amp. thru 47K to point (D). Low side to chassis.	A28	Detune A46 and A47 by turning slugs well into coils. Preset A29 and A30 at center of their range. Adjust A28 for maximum gain and response similar to Fig. 5.
8.	"	"	"	"	"	"	A29, A30	Adjust for maximum gain and symmetry of response similar to Fig. 5 with markers as shown. Repeat step 7, if necessary.
9.	"	"	85MC	83.25MC	6	"	A31, A32, A33	Adjust in numerical order. First two adjustments are to place the markers correctly. Last adjustment is for maximum gain and symmetry. (See Fig. 6).
10.	"	"	"	"	"	"	A27	Adjust SLIGHTLY above point where it begins to effect channel 6 response curve at the sound marker.
11.	"	"	79MC	77.25MC 81.75MC	5	"	A34, A35, A36	Adjust in numerical order. First two adjustments are to place the markers correctly. Last adjustment is for maximum gain and symmetry. (See Fig. 6).
12.	"	"	69MC	67.25MC 71.75MC	4	"	A37. A38, A39	"
13.	"	"	63MC	61 25MC 65.75MC	3	"	A40, A41, A42	"
14.	"	"	57MC	55.25MC 59.75MC	2	"	A43. A44, A45	"
15.	"	"	Not used	42.5MC (400∿ 30% AM Mod)	"	Vert. Amp. thru 47K to point (C). Low side to chassis.	A46	Adjust for MINIMUM 400∿ indication on scope.
16.	"	"	"	44.5MC (400∿ 30% AM Mod)	"	"	A47	"

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3924 MEADE ST.
DENVER, COLORADO

VHF RF AND MIXER ALIGNMENT FOR TUNERS #WTT-98Y, WTT-99Y AND RTT-99Y

Short the tuner AGC to ground by connecting a clip lead from point (F) to chassis.
Remove the tuner cover.
Connect the synchronized sweep voltage from the sweep generator to the horizontal input of the oscilloscope for horizontal deflection.
The sweep generator output lead should be terminated with its characteristic impedance, usually 50 ohms.
Use only enough sweep generator output to provide a usable pattern on scope.
Use 10MC sweep unless otherwise noted.
Coils not containing adjustable cores are adjusted by expanding or compressing coil turns.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
5.	Two 120Ω Carbon Resistors	Across VHF antenna terminals with 120Ω in each lead.	213MC	211.25MC 215.75MC	13	Vert. Amp. thru 47K to point (D). Low side to chassis.	A48	Preset A49 and A50 to mid-range. Adjust A48 for maximum gain of response curve similar to Fig. 5.
6.	"	"	183MC	181.25MC 185.75MC	7	"	A49, A50	Adjust for maximum gain and symmetry of response similar to Fig. 5 with markers as shown.
7	"	"	85MC	83.25MC 87.75MC	6	"	A51, A52, A53	Adjust in numerical order for response similar to Fig. 6. First two adjustments are for proper placing of markers. The third adjustment for maximum gain and symmetry.
8.	"	"	"	83.25MC	"	"	A54	Adjust until it starts to pull down the marker of the sound side of the curve.
9.	"	"	79MC	77.25MC 81.75MC	5	"	A55, A56, A57	Adjust in numerical order for response similar to Fig. 6. First two adjustments are for proper placing of markers. The third adjustment for maximum gain and symmetry.
10.	"	"	69MC	67.25MC 71.75MC	4	"	A58, A59, A60	"
11.	"	"	63MC	61.25MC 65.75MC	3	"	A61, A62, A63	"
12	"	"	57MC	55.25MC 59.75MC	2	"	A64, A65, A66	"
13.	"	"	"	"	"	"	A67	Adjust until its effect is below channel 2 (or at interference frequency).

ALIGNMENT INSTRUCTIONS (cont)

UHF IF ALIGNMENT

Unplug the UHF cable from the VHF tuner.
Connect the synchronized sweep voltage from the sweep generator to the horizontal input of the oscilloscope for horizontal deflection.
Use only enough sweep generator output to provide a usable pattern on scope.
A70 is not used in Tuners #WTT-98Y, WTT-99Y, RTT-99Y

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
17.	Fig. 7	High side to point (G). Low side to chassis.	44.0MC (10MC Swp)	41.25MC 45.75MC	UHF	Vert. Amp. thru 47K to point (D). Low side to chassis.	A68, A69	Adjust for maximum gain and symmetry of response similar to Fig. 8 with markers as shown.
18.	Disconnect sweep generator and connect a short from pin 1 to pin 4 of the antenna input assembly. Connect the DC probe of the VTVM to point (C). Low side to chassis. Adjust A70 for maximum DC noise voltage.							

REMOTE CONTROL RECEIVER ALIGNMENT

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	CHANNEL	CONNECT VTVM	ADJUST	REMARKS
19.	Directly	High side to microphone input. Low side to chassis.	Exactly 40KC		DC probe to pin 7 (grid) of 6AW8A (V23). Common to chassis.	R117	Adjust R117 (sensitivity control) for maximum negative voltage.
20.	"	"	"		DC probe to point (H). Common to chassis.	A71	Set VTVM to -150 volts DC scale. Increase generator until VTVM reads approximately -75 volts. Leave generator at this setting. Adjust A71 for maximum deflection.
21.	"	"	"		"	A72	Turn slug as far out of coil as possible, then start tuning. As the slug is turned into the coil, the 4th harmonic will be passed. Continue tuning into coil until the next peak is obtained. This will be the 3rd harmonic of 40KC and will be a larger voltage than the 4th harmonic.
	NOTE: A73 has not been adjusted. Due to additional equipment requirements it is normally adjusted only at the factory. Therefore, adjustments of A73 should only be made if the coil has been replaced or tampered with. Remove the signal generator and plug the microphone back in its socket. Connect either a high impedance AC meter (capable of reading .1 volt) or an oscilloscope thru a .5mfd capacitor to pin 2 (grid) of 6AW8A (V20). Low side to chassis. Place the transmitter approximately 3 inches away from the receivers microphone, press the channel swlector button of the transmitter and rotate the unit for maximum meter or scope indication. Without moving the transmitter, adjust A73 for maximum indication. Remove the AC meter or scope and remove the transmitter. Remove the microphone.						
22.	Directly	High side to microphone input. Low side to chassis.	40KC		DC probe to point (H). Common to chassis.		Increase generator output until no further increase in voltage is noted on the VTVM.
23.	"	"	"		DC probe to pin 5 (cathode) of 6AL5 (V22). Common to pin 1 (cathode) of V22.	A74	Adjust for zero reading on VTVM.
24.	"	"	"		DC probe to pin 7 (grid) of 6AW8A(V23). Common to chassis.	R117	Adjust for a reading at -25 volts.

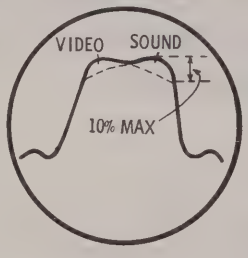


FIG.6

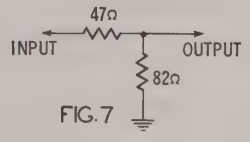


FIG.7

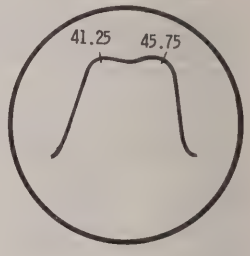
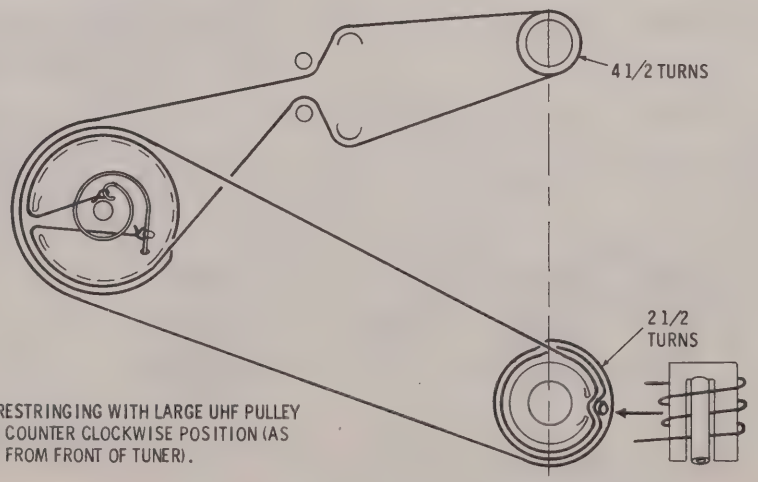


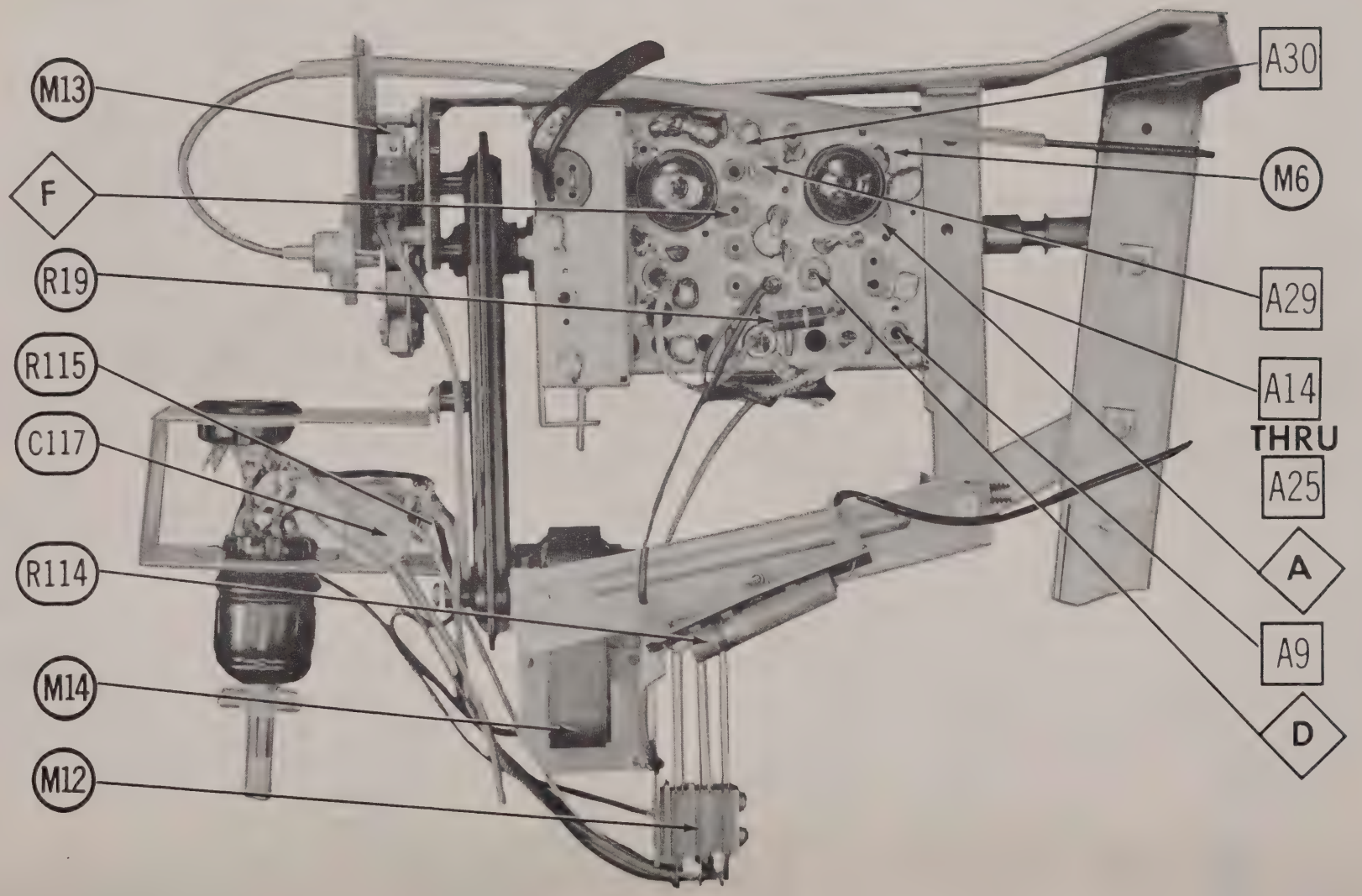
FIG.8


4 1/2 TURNS
2 1/2 TURNS
START RESTRINGING WITH LARGE UHF PULLEY IN MAX COUNTER CLOCKWISE POSITION (AS VIEWED FROM FRONT OF TUNER).

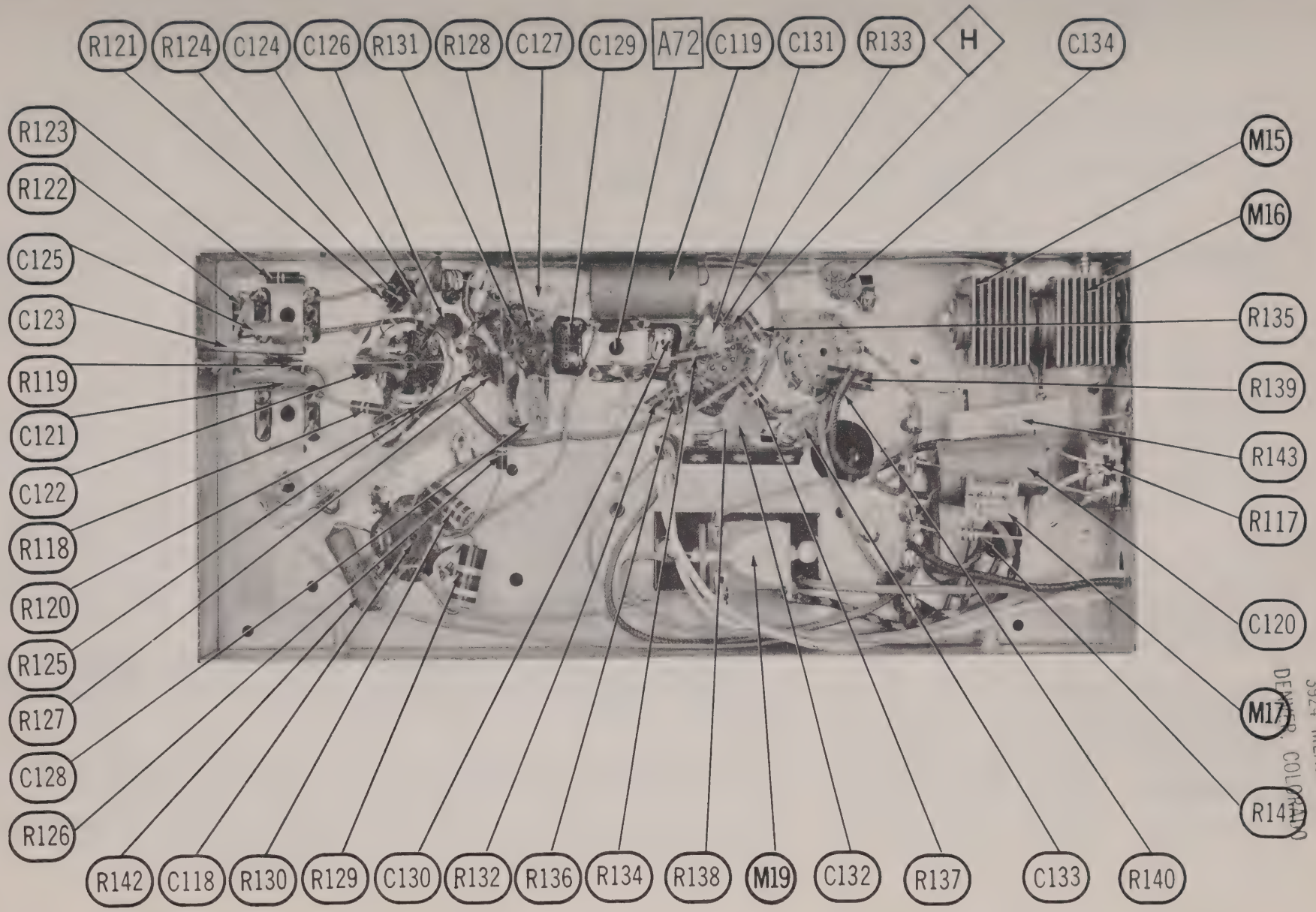
UHF DRIVE CORD STRINGING

ALTERNATE TUNER SCHEMATIC

MIXER A 6U8
OSC B 6U8
RF AMP 6BC8
FINE TUNING
CHANNEL SELECTOR SWITCH SHOWN IN CHANNEL 13 POSITION
VHF TUNER PART #TT-98Y, TT-99Y, WTT-98Y & WTT-99Y
UHF TUNER B+
TO UHF TUNER FILAMENT
UHF IF INPUT
VHF ANT TERMINAL BOARD
300Ω INPUT
75Ω INPUT
TO PIN 6 OF RF AMP (6BC8)
TO PIN 7 OF RF AMP. (6BC8) & 22K GRID RESISTOR
RF INPUT CIRCUIT USED IN TUNER PART #WTT-98Y & WTT-99Y
A PHOTOFACT STANDARD NOTATION SCHEMATIC
Howard W. Sams & Co., Inc. 1958



TUNER ASSEMBLY - TOP VIEW



REMOTE RECEIVER - BOTTOM VIEW

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PARTS LIST AND DESCRIPTIONS

TUBES (GENERAL ELECTRIC, SYLVANIA)

ITEM No.	USE	TYPE	NOTES
V1	RF Amplifier	6BC8	
V2	Mixer-Osc.	6U8	
V3	1st. Video IF Amp.	3BZ6	
V4	2nd. Video IF Amp.	3BZ6	
V5	3rd. Video IF Amp.	3CB6	
V6	Video Output	12BY7A	
V7	AGC Keying-Sync Sep.	3BU8	
V8	Sound IF Amp.	3CB6	
V9	Audio Det.	3DT6	
V10	Audio Output	6AQ5	

ITEM No.	USE	TYPE	NOTES
V11	Sync Amp.-Vert. Mult.	6CG7	
V12	Vert. Mult.-Vert. Output	6AQ5	
V13	Horiz. AFC	6AL5	Note 1
V14	Horiz. Mult.	6CG7	
V15	Horiz. Output	6DQ6	
V16	Damper	6AU4GT	
V17	HV Rectifier	3A3	
V18	LV Rectifier	5U4GB	

Note 1. In chassis coded A-10 a dual selenium rectifier (Part #48B742698) is used in this application.

PICTURE TUBE

ITEM No.	REPLACEMENT DATA				NOTES
	MOTOROLA PART No.	GENERAL ELECTRIC PART No.	RCA PART No.	SYLVANIA PART No.	
V19	21CBP4A		21CBP4-A ①	21CBP4/ 21CBP4A ②	① "Silverama" ② "Silver Screen 85"

ELECTROLYTIC CAPACITORS

ITEM No.	RATING		REPLACEMENT DATA						
	CAP.	VOLT.	MOTOROLA PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	PYRAMID PART No.	SANGAMO PART No.	SPRAGUE PART No.
C1A	▲40	400	23B744120	AFH4-08	D0060	FP446	TMQ-8	Q-025	R2569 *
B	■100	400			BR4045	TC80	TD-40-450	MT-4540	
C	▲10	400							
D	10	400							
C2A	■30	400	23B743362 ①	AFH3-155-30	B0410	FP259	TMD-42	T-559	R2568 *
B	20	25			BBR20-25	TC45	TD-20-150		
C	▲10	400							

* Non-catalog item.

① Some versions may use 30-10mfd @ 500V. 20mfd @ 25V (Part #23B738750) in this application.

FIXED CAPACITORS

Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING		REPLACEMENT DATA							NOTES
	CAP.	VOLT	MOTOROLA PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ERIE PART No.	MALLORY PART No.	SPRAGUE PART No.	
C3	8.2		21R125856							N750
C4	15		21R125929		TCN-15		TC7-15			N750 5%
C5	5		21R125928	NPO-DI 5	TCZ-4R7	C10V5C	TCO-5	ZT-555	5TCCB-V5	NPO
C6	15		21R125929		TCN-15		TC7-15			N750 5%
C7	8.2		21R125856							N750
C8	.5-8		20A743920							
C9	22		21R124554		TCZ-22		TCO-22			NPO 5%
C10	8.2		21R125856							N750
C11	2.7		21R115950							①
C12	1000		21R115386	BPD-001	DD-102	BYA6D1	ED-1000	DC521	5HK-D1	
C13	1000		21A739920	EF-001	MFT-1000				503C-D1	
C14	1000		21R115386	BPD-001	DD-102	BYA6D1	ED-1000	DC521	5HK-D1	
C15	1.5		21R115959	NPO-SI 1.5	TCZ-1R5	C10V15C	TCO-1.5	ZT-5515	5TCCB-V15	
C16	.5-3		21K735985		829-3		3115E	CT565A		
C17	1.5		21R115959	NPO-SI 1.5	TCZ-1R5	C10V15C	TCO-1.5	ZT-5515	5TCCB-V15	
C18	100		21R120577	N750-SI 100	TCN-100	CTA6T1U	TC7-100	NT-531	5TCU-T1	N750
C19	22		21R124554		TCZ-22		TCO-22			NPO 5% ②
C20	.5-3		21K735985		829-3		3115E	CT565A		
C21	1000		21R115386	BPD-001	DD-102	BYA6D1	ED-1000	DC521	5HK-D1	
C22	1000		21R115386	BPD-001	DD-102	BYA6D1	ED-1000	DC521	5HK-D1	
C23	1000		21A739920	EF-001	MFT-1000				503C-D1	
C24	470		21R114554	BPD-00047	DD-471	BYA10T47	ED-470	UC-5347	5GA-T47	
C25	1.0		21R114071							N1500
C26	3.4		21R124489							
C27	1.0		21R124552							N1500
C28	10		21R124710	DI 10	D6-100	LT6Q1	GP-10	UC-541	5GA-Q1	
C29	1000		21A739920	EF-001	MFT-1000				503C-D1	
C30	1000		21R115386	BPD-001	DD-102	BYA6D1	ED-1000	DC521	5HK-D1	
C31	20-140		20A736287							
C32	5.6		21R120156							
C33	18		21R120578							N150 10%
C34	4.7		21R115954	NPO-SI 4.7	TCZ-4R7	C10V47C	TCO-4.7		5TCCB-V47	
C35	18		21R120578							N150 10%
C36	470		21R114554	BPD-00047	DD-471	BYA10T47	ED-470	UC-5347	5GA-T47	
C37	1000		21A737426	EF-001	MFT-1000				503C-D1	
C38	470		21R114554	BPD-00047	DD-471	BYA10T47	ED-470	UC-5347	5GA-T47	
C39	470		21R114554	BPD-00047	DD-471	BYA10T47	ED-470	UC-5347	5GA-T47	
C40	1000		21R115386	BPD-001	DD-102	BYA6D1	ED-1000	DC521	5HK-D1	
C41	560		21R120936		DD-561	L10T56	ED-560	UC-5356	5GA-T56	
C42	1000		21R115386	BPD-001	DD-102	BYA6D1	ED-1000	DC521	5HK-D1	
C43	.25	100	8K122045	P288N-25		CUB2P25		GEM-2025	2TM-P25	
C44	470		21R114554	BPD-00047	DD-471	BYA10T47	ED-470	UC-5347	5GA-T47	
C45	560		21R120936		DD-561	L10T56	ED-560	UC-5356	5GA-T56	
C46A	800		21R400943	BPD-0008	DD-801	L10T8	ED-0008		5GA-T8	
B	800			BPD-0008	DD-801	L10T8	ED-0008		5GA-T8	
C47	5.6		21R124490							N330
C48	3.9		21R115953							
C49	3.9		21R115953							
C50	5000		21A738298	BPD-005	DD-502	BYA10D5	ED-005	DC525	5HK-D5	
C51	47		21R114207	N750-DI 47	TCN-47	C10Q47U	TC7-47		5TCC-Q47	N750 10%
C52	27		21R119896							N150 10%
C53	.1	400	8R121006	P488N-1	DF-104	CUB4P1		GEM-401	4TM-P1	
C54	10000	1400	21R124832	DAC-27	DD16-103	HVE16S1			BL-S10	
C55	20000		21B741862	BPD-02	DD-203	BYA6S2	ED-02		5HK-S2	
C56	470	2000	21R121478	HVD-30-470	DD30-471	HVB20T47	HD3-470	DC30347	20GA-T47	
C57	2.7		21R125699							
C58	.1	400	8R121006	P488N-1	DF-104	CUB4P1		GEM-401	4TM-P1	
C59	.25	100	8K122045	P288N-25		CUB2P25		GEM-2025	2TM-P25	
C60	10		21R121114	N750-DI 10	TCN-10	C10Q1U	TC7-10	NT-541	5TCU-Q1	N750 10%
C61	18		21R120578							N150 10%
C62	1500		21R122498			1R5D15	ED-1500		MS-215	10%

PARTS LIST AND DESCRIPTIONS (Continued)

CAPACITORS (cont)

ITEM No.	RATING CAP.	RATING VOLT	MOTOROLA PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ERIE PART No.	MALLORY PART No.	SPRAGUE PART No.	NOTES
C63	.75		21K735623							
C64	5000		21A738298	BPD-005	DD-502	BYA10D5	ED-005	DC525	5HK-D5	
C65	5000		21A738298	BPD-005	DD-502	BYA10D5	ED-005	DC525	5HK-D5	
C66	5000		21A738298	BPD-005	DD-502	BYA10D5	ED-005	DC525	5HK-D5	
C67	5000		21R115312	BPD-005	DD-502	BYA10D5	ED-005	DC525	5HK-D5	
C68	18		21K120578							N150 10%
C69	10000		21R482726	BPD-01	DD-103	BYA6S1	ED-01	DC511	5HK-S1	
C70	5000		21R115312	BPD-005	DD-502	BYA10D5	ED-005	DC525	5HK-D5	
C71	150		21R121228	BPD-00015	DD-151	L10T15	ED-150	UC-5315	5GA-T15	
C72	.05	600	8R122288	P688N-05	DF-503	CUB6S5		GEM-615	6TM-S5	
C73	5000		21R115312	BPD-005	DD-502	BYA10D5	ED-005	DC525	5HK-D5	
C74	10000		21R482726	BPD-01	DD-103	BYA6S1	ED-01	DC511	5HK-S1	
C75	3300		21R120422	BPD-0033	DD-332	BYA10D33	ED-0033	UC-5233	5GA-D33	
C76	220		21R410115	BPD-00022	DD-221	L10T22	ED-220	UC-5322	5GA-T22	
C77	5000	2000	21R120093	DAC-9	DD30-502	HVC20D5		GEM-3025	BL-D50	
C78	.05	600	8R122185	P688N-05	DF-503	CUB6S5		GEM-615	6TM-S5	
C79	2000		21R121106	BPD-002	DD-203	BYA10D2	ED-002	DC522	5HK-D2	
C80	220		21R410115	DI 220	DD-201	L10T22	ED-220	UC-5322	5GA-T22	
C81	27		21R119896		TCZ-27	C10Q27C	TCO-27			
C82	.02	600	8R122079	P688N-02	DD-203	CUB6S2	ED-02	GEM-612	6TM-S2	
C83	.002	600	8R121568	P688N-002	D6-202	CUB6D2	GP-2000	GEM-622	6TM-D2	
C84	3300		21R120422	BPD-0033	DD-332	BYA10D33	ED-0033	UC-5233	5GA-D33	
C85	.007	200	8K741231					GEM-1627		10%
C86	10000		21K738700	BPD-01	DD-103	BYA6S1	ED-01	DC511	5HK-S1	
C87	.01	600	8R122285					GEM-611		10%
C88	.06	600	8R122185							10%
C89	.05	200	8R121005	P288N-05	DF-503	CUB2S5		GEM-415	2TM-S5	
C90	.02	600	8R122079	P688N-02	DD-203	CUB6S2	ED-02	GEM-612	6TM-S2	
C91	1000	2000	21R124456	HVD-30-1000	DD30-102	HVB20D1	HD3-1000	GEM-3021	BL-D10	
C92	20000		21B741862	BPD-02	DD-203	BYB6S2	ED-02		5HK-S2	
C93	.015	400	8K737422							10%
C94	10000		21R482726	BPD-01	DD-103	BYA6S1	ED-01	DC511	5HK-S1	
C95	5000	2000	21R120093		DD30-502	HVC20D5		GEM-3025	BL-D50	
C96	4700		21R120149	BPD-0047	DD-472	BYA10D47	ED-0047	UC-5247	5GA-D47	
C97	220		21R125999		D6-221	L10T22	ED-220		MS-322	10% ③
C98	220		21R125999		D6-221	L10T22	ED-220		MS-322	10% ③
C99	3300		21R120422	BPD-0033	DD-332	BYA10D33	ED-0033	UC-5233	5GA-D33	
C100	.02	200	8R121003	P288N-02	DD-203	CUB2S2	ED-02	GEM-412	2TM-S2	
C101	.0039	400	8K125942							10%
C102	150		21R121228	N750-DI 150	TCN-150	C10T15U	TC7-150		5TCU-T15	N750 10%
C103	680		21K736046	1464-00068	D6-681	5R5T68	ED-680		MS-368	10%
C104	390		21B735757		D6-391	5R5T39	ED-390		MS-339	10%
C105	5000		21A738298	BPD-005	DD-502	BYA10D5	ED-005	DC525	5HK-D5	
C106	.1	400	8R121006	P488N-1	DF-104	CUB4P1		GEM-401	4TM-P1	
C107	.1	600	8R121869	P688N-1	DF-104	CUB6P1		GEM-601	6TM-P1	
C108	.1	600	8R121869	P688N-1	DF-104	CUB6P1		GEM-601	6TM-P1	
C109	.05	200	8R121005	P288N-05	DF-503	CUB2S5		GEM-415	2TM-S5	
C110	.05	1000	8R121870	P1088N-05		CUB10S5		GEM-1015	10TM-S5	
C111	56	3000	21R127008							10%
C112	56	3000	21R127008							10%
C113	82	2000	21R120150							10%
C114	10000	1400	21R124832	DAC-27	DD16-103	HVE16S1			BL-S10	
C115	10000	1400	21R124832	DAC-27	DD16-103	HVE16S1			BL-S10	
C116A	1000		21R401058	BPD-2X001	DD2-102	BYC6DD1	ED2-001	DCD521	5HK-2D1	
B	1000									
C117	.25	400	8R121788	P488N-05	DF-503	CUB4S5		GEM-415	4TM-S5	

① In Tuners WTT-98Y, WTT-99Y a 2.2mmf (Part #21R115948) is used in this application.
② In Tuners WTT-98Y, WTT-99Y a 27mmf (Part #21R122050) is used in this application.
③ Chassis coded A-10 use 1000mmf (Part #21R128045) in this application.

CONTROLS

ITEM No.	RATING RESISTANCE	RATING WATTS	MOTOROLA PART No.	CENTRALAB PART No.	CLAROSTAT PART No.	IRC PART No.	MALLORY PART No.	INSTALLATION NOTES
R1A	250Ω	½	18C745837				■ UE3784S	Contrast - Note 1
B	2meg	½						Volume-Tap ⓐ 1.2meg-Note 1
C	Switch							
R2A	1meg	½	18K743525	B-70	A47-1meg-Z	Q13-137	TA16A	Tone
B	Shaft			Not Req.	KSS-3	Not Req.	Not Req.	
R3A	100K	½	18K741521	B-40	A47-100K-S	Q11-128	TA15L	Brightness
B	Shaft			Not Req.	KSS-3	Not Req.	Not Req.	
R4A	2meg	½	18K745394	B-75	A47-2meg-S	Q11-139	TA26L	Vert. Hold - Note 2
B	Shaft			Not Req.	KSS-3	Not Req.	Not Req.	
R5A	4meg	½	18K743524	AB-86 *	A47-4meg-S*			Vert. Size
B	Shaft			AK-19	RN-3			
R6A	2meg	½	18K743523	AB-75 *	A47-2meg-S*	B11-139	PTA26L	Vert. Lin.
B	Shaft			AK-19	RN-3	TM2-Kit	Not Req.	
R7A	100K	½	18K739549	AB-40 *	A47-100K-S*	B11-128	PTA15L	Horiz. Hold
B	Shaft			AK-19	RN-3	TM3-Kit	Not Req.	
R8A	2meg	½	18K743523	AB-75 *	A47-2meg-S*	B11-139	PTA26L	AGC
B	Shaft			AK-19	RN-3	TM2-Kit	Not Req.	

* Enlarge mounting hole to 3/8" diameter.
Note 1. An alternate part #18C743644, contrast 250Ω, volume 2meg tap ⓐ 1.5meg may be used in some versions. These versions use on-off switch (Part #40B745748).
Note 2. Alternate part #18K395556 may be used in some versions.
■ "STA-LOC" Equivalent: FA251L, OS1812A, RU26T125, IS2500, US-41.

RESISTORS

All wattages 1/2 watt, or less, unless otherwise listed.

ITEM No.	RATING OHMS	RATING WATT	MOTOROLA PART No.	NOTES
R9	22K		6R6028	
R10	100K		6R6075	
R11	470Ω		6R3949	
R12	4700Ω		6R6039	
R13	39K		6R6487	
R14	15K		6K124551	
R15	15K		6R2119	
R16	270K		6R6414	
R17	15K		6R2119	
R18	3300Ω		6R5581	
R19	8200Ω	1	6K125833	
R20	470K			
R21	1500Ω	2	6R2005	
R22	1.5meg 5%		6K127000	
R23	15meg 5%		6K125891	
R24	27K		6R6434	
R25	1000Ω		6R6301	
R26	33K		6R6410	

PROPERTY OF
L. F. BLANKENSHIP
3924 MEADE ST.
DENVER, COLORADO

PARTS LIST AND DESCRIPTIONS (Continued)

RESISTORS (cont)

ITEM No.	RATING OHMS	WATT	MOTOROLA PART No.	NOTES
R37	8200Ω	2	17KT43283	
R38	47Ω		6R5850	
R39	27K		6R6434	
R40	1000Ω		6R6329	
R41	6300Ω	3	17KT58283	
R43	47Ω		6R5830	
R45	47K		6R6048	
R46	1200Ω		6R6193	
R35	680K		6R6475	
R38	8200Ω	3	17KT58283	
R37	120Ω		6R5851	
R38	2900Ω		6R5859	
R39	5600Ω	10	17KT44407	
R50	18K		6R5916	
R41	56K		6R6378	
R42	220K		6R6407	
R43	100K		6R6031	
R44	10K		6R6054	
R45	68K		6R6081	
R48	33K		6R6012	
R47	820K		6R6439	
R48	47K		6R6048	
R49	2.5meg		6R6423	
R50	33K		6R6012	
R51	150K			
R52	47K	4	17KT43157	
R53	4700Ω		6R6052	
R54	1000Ω		6R5301	
R55	47K		6R6048	
R56	150Ω		6R6373	
R57	470K		6R6377	
R58	680K		6R6475	
R59	2300Ω		6R6290	
R60	33K		6R6444	
R61	560K		6R6397	
R62	330K		6R6393	
R63	22K	1	6R6341	
R64	560Ω		6R6286	
R65	4700Ω	2	6R2010	
R66	100Ω		6R6018	
R67	330Ω	1	6R6294	
R68	470K		6R6377	
R69	2.5meg		6R6423	
R70	2.2meg		6R6433	
R71	56K		6R6378	

ITEM No.	RATING OHMS	WATT	MOTOROLA PART No.	NOTES
R72	560K		6R5897	
R73	27K	1	6R6434	
R74	2200Ω		6R6089	
R75	2300Ω		6R6069	
R76	5.6meg		6K24781	
R77	18K		6K23946	
R78	180K		6R6444	
R79	1meg		6R6048	
R80	22K		6K23568	
R81	1meg		6R6048	
R82	10K		6R6477	
R83	8200Ω		6R2094	
R84	18K		6R5891	
R85	180K		6R6444	
R86	470K		6R6052	
R87	330K		6R6407	
R88	22K		6K23568	
R89	1KΩ	1	6R6330	
R90	560Ω		6K23802	
R91	560Ω		6K23802	
R92	470K		6R6377	
R93	470K		6R6377	
R94	4.7meg		6R2123	
R95	4.7meg		6R2123	
R96	8200Ω		6R2094	
R97	1000Ω		6R5329	
R98	39K		6R6487	
R99	220K		6R6407	
R100	56K		6R6378	
R101	6800Ω		6R6428	
R102	6800Ω		6R6428	
R103	470Ω		6R3949	
R104	1meg		6R6048	
R105	8200Ω	2	6R5725	
R106	12Ω	1	6R2030	Note 3
R107	220K		6R6407	
R108	330K		6R2096	
R109	6800Ω	1	6R490492	
R110	12Ω		6RU1228	
R111	1.8Ω		17KT42815	
R112	27K	1	6R6427	
R113	10K	3	17KT44484	
R114	1.5Ω	2		Note 4
R115	27Ω			
R116	470K		6R6032	

Note 1. Chassis coded A-10 use 100K (Part #6R6031) in this application.
Note 2. Not used in chassis coded A-10
Note 3. Some versions may use 12Ω (Part #6R6031) in this application.
Note 4 Not used in some versions

TRANSFORMER (POWER)

ITEM No.	RATING PRI	SEC 1	SEC 2	MOTOROLA PART No.	Halldorson PART No.	Merit PART No.	Ram PART No.	Stancor PART No.	Thordorson PART No.	Triad PART No.
T1	117VAC @ 1.7A	540VCT @ 280A	5V @ 3A	25D745331 ①					26R90 ②	
	SEC. 3	SEC. 4	SEC. 5							
	6.3V @ 9.2A									

① Alternate part #24D743311.
② Use universal mounting brackets. Parallel and phase 6.3V @ 1.5A and 6.3V @ 8A windings.

TRANSFORMERS (SWEEP CIRCUITS)

ITEM No.	USE	MOTOROLA PART No.	Halldorson PART No.	Merit PART No.	Ram PART No.	Stancor PART No.	Thordorson PART No.	Triad PART No.	NOTES
T2	Vert Output Alt Vert Output	25C743634-B2	1900 ①	A-3623	1-V316	A-8146 ④	26S71 ⑤	Alt6X ⑤	
T3A	Yoke-Horiz (24MH)	24D744064	DF-610 ⑤				Y-15 ⑤	Y-44 & NW4	
B	(90W)-Vert (329MH) Alternate Yoke	24D743522	DF-610 ⑤				Y-15 ⑤	Y-44 & NW 4	
M9	Yoke Clamp Rear Cover & Centering Device	43K743456							
T4	Horiz Output Primary Coil Secondary Coil	43A743407 24C744042 ⑥ 24C744044 24C744043			HVO-130				

① Connect as autoformer.
② Use 8 to 1 turns ratio.
③ Drill new mounting hole(s).
④ Cut and tape blanking lead.
⑤ Use original rear cover, centering device, width sleeve and horizontal damping network if necessary.
⑥ Black coded coils and uncoded transformers used in chassis coded A-30. Red coded coils and transformers used in chassis coded A-01 and A-02. Orange coded coils and transformers used in A-03 and later chassis. When replacing secondary coil or complete transformer, change resistor R106 to 12Ω 1W, if any other value is used.

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	IMPEDANCE PRI	SEC	MOTOROLA PART No.	Halldorson PART No.	Merit PART No.	Ram PART No.	Stancor PART No.	Thordorson PART No.	Triad PART No.	NOTES
T5	5000Ω	3-4Ω	25K743121	Z1003	A-3019	AU-600	A-8092	26S49	S-5Z	① Alternate part number.
	5000Ω	3-4Ω	25K74210 ①	Z1107	A-2930	AU-601	A-3877	26S51	S-3X	

SPEAKER

ITEM No.	TYPE SIZE	FIELD	V C IMP	REPLACEMENT DATA MOTOROLA PART No.	QUAM PART No.	NOTES
SP1	8"	PM	6-8Ω	50K740263 ①	8AIIPA ②	① Manufacturer states toreplace with part #50K740261
SP3	8"	PM	6-8Ω	50K740254 ①	8AIIPA ②	② Phase.
	6"	PM	6-8Ω	50K743277 ④		③ Used in Models 21K80CW, CWA, Y21K80CW, CWA,
	8"	PM	6-8Ω	50K745278 ④		21V19W, WA, Y21V19W, WA
	4"	PM	6-8Ω	50K745315 ④		④ Used in Models 21F8B, BA, W, WA, Y21F8B, BA, W,WA
	6"x9"	PM	3-4Ω	50K744621 ⑤		⑤ Used in Models 21K73B, M, Y21K73B, BA, M, MA.
	8"	PM	3-4Ω	50JT39233 ⑤		Manufacturer states to replace with part #50JT40279.
	5 1/4	PM	3-4Ω	50K739375 ⑤		⑥ Used in Models 21K73B, CW, M, Y21K73B, BA, CW,
	5 1/4	PM	6-8Ω	50K744706 ③		CWA, M, MA, 21K78B, CW, M, Y21K78B, BA, M, MA.
	4"	PM	6-8Ω	50K744708 ③		⑦ Used in Models 21K40BQ, MG, Y21T40BQ, BGA, MG,
	8"	PM	6-8Ω	50K744704 ⑦		MGA. Manufacturer states to replace with part #50JT39234
	12"	PM	3-4Ω	50JT45899 ⑥		⑧ Used in Models 21T43B, M, Y21T42B, BA, M, MA.
	4"	PM	6-8Ω	50K746185 ⑧		⑨ Used in Models 21K77B, M, Y21K77B, M. Manufacturer
						states to replace with part #50D434504.
						⑩ Used in Models 21K77B, M, Y21K77B, M.
						⑪ Used in Models 21K81B, M, Y21K81B, M.
						⑫ Two used in Models 21K81B, M, Y21K81B, M.
						Manufacturer states to replace with part #50K746444.

COILS (RF-IF)

ITEM No.	USE	MOTOROLA PART No.	NOTES
L1	Ant. Coil	24C744300	
L3	Ant. Coil	24C744300	
L5	IF Trap Coil	1B745803	
L6	IF Trap Coil	1B745800	
L7	IF Trap Coil	24C743930	
L8	IF Trap Coil	1B743913	
L7	IF Trap Coil	24D743947	
L8	Ant. Coils	1V743895	Channel 2-13 Wafer Assy. includes C9, C10, C12
L9	Neutr. Coil	24A739297	

ITEM No.	USE	MOTOROLA PART No.	NOTES
L10	RF Coils	1V743647	Channel 2-13 Wafer Assy. Includes C17, C18, R11
L11	Mixer Grid Coils	1V738869	Channel 2-13 Wafer Assy. Includes C19
L12	Osc. Coils	1V738861	Channel 2-13 Wafer Assy. Includes C27, C28, R18
L13	Mixer Plate Coil	24B739079	

ITEM No.	USE	MOTOROLA PART No.	Meissner PART No.	Merit PART No.	Miller PART No.	Ram PART No.	NOTES
L14	47.25MC Trap	24K743383					
L15A	40MC Trap	24K743725					
B	Bandpass Coil						
L16	1st. Video IF	24K743453	17-6525	TV-130	6319	VF-3	
L17	F'il. Choke	24K743675	19-1001	BC-563	4604		1.5 Microhenries
L18	2nd. Video IF	24K743236	17-6524	TV-130	6319	VF-3	
L19	F'il. Choke	24K743675	19-1001	BC-563	4604		1.5 Microhenries
L20	3rd. Video IF	24K743330	17-6524	TV-130	6319	VF-3	
L21	4th. Video IF	24C743408					Includes M4
L23	Resonant Choke	24R118689					10 Microhenries
L23	RF Choke	24K740648	19-1005	BC-566	4615		10 Microhenries, IRC part #CL-1
L24	Shunt Peaking Coil	24C736008	19-3180	TV-184	6180	VF-5	180 Microhenries
L25	Series Peaking Coil	24K744411	19-3100 *	TV-181 *	6118 *	VF-3 *	100 Microhenries, wound on 5600Ω resistor
L26	4.5MC Trap	24K739290	30-1004	TV-151	1469 ▲	SF-3	
L27	Series Peaking Coil	24K744409	19-6400 +	TV-303 +	6136 +		400 Microhenries, wound on 12K resistor
L28	Shunt Peaking Coil	24K744410	19-6400	TV-303	6136		400 Microhenries
L29	Shunt Peaking Coil	24K743340					1400 Microhenries, wound on 2700Ω resistor
L30	RF Choke	24K743727			4611		7.5 Microhenries, IRC part #CLA
L31	1st. Sound IF	24D743463					
L32	2nd. Sound IF	24D738943	17-5496 †	TV-113 †	6308 †	SF-3 †	
L33	Quadrature Coil	24B743438			4611		
L34	RF Choke	24K743727			4611		7.5 Microhenries, IRC part #CLA
L35	RF Choke	24K743727			4611		7.5 Microhenries, IRC part #CLA

* Parallel with 5600Ω resistor.
▲ Disregard tap.
+ Parallel with 12K resistor.
† Remove C88 from circuit.

TRANSFORMER (HORIZ. OSC.)

ITEM No.	DC RES PRI.	SEC.	MOTOROLA PART No.	Meissner PART No.	Merit PART No.	Miller PART No.	Ram PART No.	Thordorson PART No.	NOTES
L36	35Ω		24B743426	19-1576 *	TV-165 *	6210 *	H-102 *	HS-5 *	12-45 Millihenries * Fabricate mounting

FILTER CHOKE

ITEM No.	RATINGS CURRENT (Measured)	DC RES.	INDUCTANCE (@ CURRENT 1000 ~/s)	MOTOROLA PART No.	Halldorson PART No.	Merit PART No.	Ram PART No.	Stancor PART No.	Thordorson PART No.	Triad PART No.
L37	190A	85Ω	2.5 Hy.	25K743512	CS037 ①	C-3996 ①		C-2334 ①	26C44	C-17Z

① Drill new mounting hole.

COMPONENT COMBINATIONS

ITEM No.	USE	DESCRIPTION	MOTOROLA PART No.	REPLACEMENT DATA
K1	Video Coupling	5000mmf, 68K	Note 1	
K2	Tone Compensation	3300mmf, 68K	Note 1	

Note 1. Some versions may use individual components in this application.

FUSES

ITEM No	TYPE	RATING	MOTOROLA PART No. FUSE	MOTOROLA PART No. HOLDER	LITTELFUSE PART No. FUSE	LITTELFUSE PART No. HOLDER	BUSS PART No. FUSE	BUSS PART No. HOLDER
M1	3AG	5A 250V	65A742612	31A737466	312005 (3AG-5A-250V)	357001	MTH5	4405
M2	N	3/10A 125V S/B	65B743104	98C743152	333.300 (N 3/10A-250V S/B)	346008	N 3/10	HN 0 to 3/10
M3	2" Length of #26 Copper Wire							

CRYSTAL DIODES

ITEM No.	ORIG TYPE	REPLACEMENT DATA MOTOROLA PART No	CBS PART No	SYLVANIA PART No	NOTES
M4		48C739300	1N80	1N80	Video Detector (Clip-in)

MISCELLANEOUS

ITEM No.	PART NAME	MOTOROLA PART No.	NOTES
M5	Pilot Light	55K946749	#51- Some versions may use type #44 . Others use no light.
M6	Tuner		VHF (TT-99S) Less tubes and antenna input assy.
	Tuner	1V745361	VHF (TT-99) Less tubes and antenna input assy.
	Tuner	1V745864	VHF (VTT-99) Less tubes and antenna input assy.
	Tuner	1V745330	VHF (TT-98) Less tubes and antenna input assy.
	Tuner	1V745862	UHF-VHF (TT-99Y) Less tubes and antenna input assy.
	Tuner	1V745885	UHF-VHF (VTT-99Y) Less tubes and antenna input assy.
	Tuner	1V745863	UHF-VHF (WTT-99Y) Less tubes and antenna input assy.
	Tuner	1V745883	UHF-VHF (RTT-99Y) Less tubes and antenna input assy.
	Tuner	1V745859	UHF-VHF (TT-98Y) Less tubes and antenna input assy.
	Tuner	1V745331	UHF-VHF (WTT-98Y) Less tubes and antenna input assy.
	Tuner	7TR744380	UHF
	Tuner		UHF (VTT-99)
	Tuners		NOTE: Tuners TT-99 and VTT-99; TT-99Y and VTT-99Y; WTT-99Y and RTT-99Y are electrically identical as grouped and are mechanically different.
	Antenna Input	1V743894	Complete assy. Used with tuners TT-98, TT-98, TT-98Y, TT-99Y, VTT-99, VTT-99Y
	Antenna Input	1V739779	Complete assy. Used with tuners WTT-98Y, WTT-99Y, RTT-99Y
M7	Width Sleeve	14A743974	
M8	Centering Device	48A743407	Includes yoke cover
M9	Magnet	48B737385	Anti-pin cushion (3 used)
M10A	Heater Resistor	1V739784	Includes bracket and strip assy.
B	Thermostat	80B744584	
C	Retainer	42A744866	For Thermostat
M11	Switch	40B746130	Channel Selector (Push type)
M12	Switch	40K748898	Shaft (leaf type)
M13	Switch	40B748265	Index Wheel Cam (leaf type)
M14	Switch	59D743696	Includes shaft switch
	Motor	40B638809	TV-Phono - Models 21F8B, BA, W, WA, Y21F8B, BA, W, WA

CABINETS & CABINET PARTS

(When Ordering Cabinets & Cabinet Parts, Specify Model, Chassis & Color)

NAME	PART NO.	DESCRIPTION
Safety Glass	41K743646	Models 21K80CW, Y21K80CW, CWA, 21T42B, M, Y21T42B, BA, M, MA, 21V19W, Y21V19W, WA, 21F8B, W, Y21F8B, W, WA
Safety Glass	41C745180	Models 21K73B, M, Y21K73B, BA, M, MA, 21K75B, CW, M, Y21K75B, BA, CW, CWA, M, MA, 21K78B, CW, M, Y21K78B, BA, M, MA, 21T40BG, MG, Y21T40BG, MG, Y21T40BG,BGA, MG, MGA
Bezel	13K743468	Picture Tube - Models 21K80CW, Y, Y21K80CW, CWA, 21F8B, -W, Y21F8B, BA, W, Y21V19W, Y21V19W, WA
Bezel	13F743980	Picture Tube - Models 21K73B, M, Y21K73B, BA, M, MA, 21K76B, CW, M, Y21K76B, BA, M, MA, 21T40BG, MG, Y21T40BG, BGA, MGA, MG, 21K75B, CW, M, Y21K75B, BA, CW, CWA, M, MA
Bezel	13F743487	Picture Tube - Models 21T42B, M, Y21T42B, BA, M, MA, 21K78B, M, Y21K77B, M
Bezel	13K745013	Models 21F8BA, W, Y21F8BA, WA, Y21K80CWA, Y21V19W
Bezel	13K743468	Models 21K81B, M, Y21K81B, M, Y21V19W
Knob	36C743543	VHF Channel Selector - Models 21K73B, M, Y21K73B, BA, M, MA, 21K75B, CW, M, Y21K75B, BA, CW, CWA, M, MA, 21K76B, CW, M, Y21K76B, BA, M, MA, 21T40BG, MG, Y21T40BG, BGA, MG, MGA
Knob	36C743508	UHF Channel Selector - Models 21T42B, M, Y21T42B, BA, M, MA, 21K77B, M, Y21K77B, M
Knob	36C743433	Fine Tuning - Models 21K80CW, CWA, 21F8B, W, 21V19W, 21K81B, M, 21V19WA, 21F8BA, WA
Knob	36C743437	Fine Tuning - Models Y21K80CW, CWA, Y21F8B, BA, W, WA, Y21V19W, Y21K81B, M
Knob	36K743541	Fine Tuning - Models 21K73B, M, 21K75B, CW, M, 21T40BG, MG, 21K76B, CW, M
Knob	36C743540	Fine Tuning - Models Y21K73B, BA, M, MA, Y21K75B, BA, CW, CWA, Y21K76B, BA, CW, CWA, M, MA, Y21T40BG, BGA, MG, MGA
Knob	36K743507	Fine Tuning - Models 21T42B, M, 21K77B, M
Knob	36C743506	Fine Tuning - Models Y21T42B, BA, M, MA, Y21K77B, M
Knob	36D743434	On-off-volume - Models 21K80CW, Y21K80CW, CWA, 21F8B, W, Y21F8B, BA, W, WA, 21T42B, M, Y21T42B, BA, M, MA, 21V19W, Y21V19W, WA, 21K81B, M, Y21K81B, M, 21K77B, M, Y21K77B, M
Knob	36K743539	On-off-volume - Models 21K73B, M, Y21K73B, BA, M, MA, 21K75B, CW, M, Y21K75B, BA, CW, CWA, M, MA, 21K76B, CW, M, Y21K76B, BA, M, MA, 21T40BG, MG, Y21T40BG, BGA, MG, MGA
Knob	36D743435	Contrast - Models 21K80CW, CWA, Y21K80CW, CWA, 21F8B, W, Y21F8B, BA, W, WA, 21T42B, M, Y21T42B, BA, M, MA, 21V19W, Y21V19W, WA, 21K81B, M, Y21K81B, M
Knob	36K743538	Contrast - Models 21K73B, M, Y21K73B, BA, M, MA, 21K75B, CW, M, Y21K75B, BA, CW, CWA, M, MA, 21K76B, CW, M, Y21K76B, BA, M, MA, 21T40BG, MG, Y21T40BG, BGA, MG, MGA
Knob	36K746089	Horiz. Hold - Models 21K80CW, CWA, Y21K80CW, CWA, 21K81B, M, Y21K81B, M
Knob	36D743431	Tone, Brightness, Vert. Hold - Models 21K80CW, CWA, Y21K80CW, CWA, 21V19W, WA, Y21V19W, WA, 21K73B, M, Y21K73B, M, 21K81B, M, Y21K81B, M, Y21T42B, BA, M, MA, 21F8B, W, Y21F8B, BA, W, WA
Knob	36C744447	AGC, Vert. Size, Vert. Lin. - Models 21F8B, WA,Y21F8B, BA, W, WA, 21V19W, Y21V19W, WA
Knob	36K744448	Horiz. Hold - Models 21F8B, W, Y21F8B, BA, W, WA, 21V19W, WA, Y21V19W, WA
Knob	36K883392	TV-Phono, Bass, Treble, Volume - Models 21F8B, W, Y21F8B, BA, W, WA
Knob	36K743432	Brightness, Vert. Hold - Models 21K73B, M, Y21K73B, BA, M, MA, 21K75B, CW, M, Y21K75B, BA, CW, CWA, M, MA, 21K76B, CW, M, Y21K76B, BA, M, MA, 21T40BG, MG, Y21T40BG, BGA, MG, MGA, 21K81B, M, Y21K81B, M
Knob	36A734772	Horiz. Hold - Models 21T42B, M, Y21T42B, BA, M, MA
Pushbutton	38C743594	Front Channel Selector - Models 21K80CW, CWA, 21V19W, WA, 21F8B, BA, W, WA, 21K81B, M
Pushbutton	38K743991	Front Channel Selector - Models Y21K80CW, CWA, Y21F8B, BA, W, WA, Y21V19W, WA, Y21K81B, M
Pushbutton	38K743595	Rear Channel Selector - Models 21K80CW, Y21K80CW, CWA, 21F8B, BA, W, WA, Y21F8B, BA, W, WA, 21V19W, WA, Y21V19W, WA, 21K81B, M, Y21K81B, M
Pushbutton	38C743715	Front Channel Selector - Models 21K73B, CW, M, Y21K73B, BA, M, MA
Pushbutton	38K743716	Rear Channel Selector - Models 21K75B, CW, M, Y21K76B, BA, M, MA
UHF Dial	34K744039	Models 21K80CW, Y21K73B, M, Y21K75B, CW, M, Y21T40BG, MG
UHF Dial	34C743436	Models Y21K80CW, CWA, Y21F8BA, WA, Y21V19WA, 21K81B, M, Y21K81B,M
UHF Dial	34K744037	Models Y21F8B, W, Y21K76B, CW, M, Y21V19W

PARTS LIST AND DESCRIPTIONS (Continued)

CABINETS & CABINET PARTS (cont)

NAME	PART NO.	DESCRIPTION
UHF Dial	34C743539	Models Y21K73BA, MA, Y21K75BA, CWA, MA, Y21K76BA, CWA, MA, Y21T40BGA, Y21T40MGA, Y21T42BA, MA
UHF Dial	34K744038	Models Y21T42B, M, 21K77B, M, Y21K77B, M
Leg	16C739573	Cabinet - Models 21F8B, BA, W, WA, Y21F8B, BA, W, WA
Leg	16K744293	Base (Right Hand) - Models Y21K77B. 21K77B
Leg	16K744291	Base (Left Hand) - Models Y21K77B. 21K77B
Leg	16K744294	Base (Right Hand) - Models Y21K77M. 21K77M
Leg	16K744292	Base (Left Hand) - Models Y21K77M . 21K77M
Leg	16K744477	Cabinet - Models 21V1W, WA, Y21V1W, WA
Leg	16K743630	Cabinet - Models 21K73B, Y21K73B, BA
Leg	16C743777	Cabinet- Models 21K73M, Y21K73M, MA
Leg	16K744157	Cabinet - Models 21K75B, Y21K75B, BA. 21K76B, Y21K76B, BA
Leg	16K744158	Cabinet - Models 21K75CW, Y21K75CW. CWA, 21K76CW, Y21K76CW, CWA
Leg	16K744156	Cabinet - Models 21K75M, Y21K75M. MA, 21K76M, Y21K76M, MA
Cabinet	16K744290	Masonite(Blond Oak) - Models Y21K77B. 21K77B
Cabinet	16E744289	Masonite (Swirl Mahogany) - Model Y21K77M, 21K77M
Cabinet	16K745882	Masonite (Blond Oak) - Model Y21K81B, 21K81B
Cabinet	16E745881	Masonite (Mahogany) - Model Y21K81M. 21K81M
Cabinet	16F743722	Cherrywood - Models 21K80CW, CWA, Y21K80CW, CWA
Cabinet	16K744660	Swedish Oak - Models 21F8B, BA. Y21F8B, BA
Cabinet	16E744659	Walnut - Models 21F8W, WA, Y21F8W, WA
Cabinet	16K745184	Masonite (Blond Oak) - Models 21K73B, Y21K73B, BA
Cabinet	16K745183	Masonite (Sierra Mahogany) - Models 21. 73M, Y21K73M, MA
Cabinet	16K744154	Masonite (Swedish Oak) - Models 21K75B, Y21K75B, BA, 21K76B, Y21K76B, BA
Cabinet	16K744155	Masonite (Fruitwood) - Models 21K75CW, Y21K75CW, CWA, 21K76CW, Y21K76CW, CWA
Cabinet	16E744153	Masonite (Dawn Mahogany) - Models 21K75M, Y21K75M, MA, 21K76M. Y21K76M, MA
Cabinet	16K743637	Metal (Limed Oak) - Models 21T40BG. Y21T40BG, BGA
Cabinet	16K743636	Metal (Mahogany Grain) - Models 21T40MG, Y21T40MG, MGA
Cabinet	16K743813	Masonite (Blond Oak) - Models 21T42B. Y21T42B, BA
Cabinet	16E743812	Masonite (Sierra Mahogany) - Models 21T42M, Y21T42M, MA
Cabinet	16E744958	Walnut, Corner - Models 21V1W, WA, Y21V1W, WA

WIRING DATA

High Voltage Lead	Use BELDEN No. 8869
Shielded Hook-up Wire	Use BELDEN No. 8885 (Single Conductor) 8738 (Two Conductor)
General-use Unshielded Hook-up Wire	Use BELDEN No. 8530 (Solid) Available in Ten Colors 8524 (Stranded) Available in Ten Colors
Power Cord (Interlock Type)	Use BELDEN No. 8874
300Ω Tuner Input Lead	Use BELDEN No. 8225
300Ω Antenna Lead-in	Use BELDEN No. 8230 or 8275
Antenna Rotor Cable	Use BELDEN No. 8464 (Flat) or 8484 (Round) - 4 Conductor 8485 (Round) - 5 Conductor 8488 (Round) - 8 Conductor

REMOTE RECEIVER
PARTS LIST AND DESCRIPTIONS
TUBES (GENERAL ELECTRIC, SYLVANIA)

ITEM No.	USE	TYPE	NOTES
V20	1st. 40KC Amp. - 2nd. 40KC Amp.	6AW8A	
V21	3rd. 40KC Amp. - Limiter-Tripler	6AW8A	
V22	120KC Discriminator	6AL5	
V23	Off-On-Relay Control-Channel Selector Relay Control	6AW8A	

ELECTROLYTIC CAPACITORS

ITEM No.	RATING CAP.	RATING VOLT.	REPLACEMENT DATA MOTOROLA PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	PYRAMID PART No.	SANGAMO PART No.	SPRAGUE PART No.
C118A	■10	450	23B745624	AFH4-10	D0090	FP434	TMQ-10	Q-030	TVL-4760
B	▲10	450							
C	10	450							
D	▲10	450							
C119	10	50	23A90205	PRS50V10	BBR10-50	TC32	TD-10-50	MT-0510	TVA-1304
C120	10	50	23A90205	PRS50V10	BBR10-50	TC32	TD-10-50	MT-0510	TVA-1304

FIXED CAPACITORS

Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING CAP.	RATING VOLT	REPLACEMENT DATA MOTOROLA PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ERIE PART No.	MALLORY PART No.	SPRAGUE PART No.	NOTES
C121	20000		21K745774	BPD-02	DD-203	BYB6S2	ED-02		5HK-S2	
C122	470		21R125529	BPD-00047	DD-471	BYA10T47	ED-470	UC-5347	5GA-T47	
C123	20000		21K745774	BPD-02	DD-203	BYB6S2	ED-02		5HK-S2	
C124	10000		21R482726	BPD-01	DD-103	BYA6S1	ED-01	DC511	5HK-S1	
C125	3300		21K741863	BPD-0033	DD-332	BYA10D33	ED-0033	UC-5233	5GA-D33	
C126	470		21R125529	BPD-00047	DD-471	BYA10T47	ED-470	UC-5347	5GA-T47	
C127	.001	600	8R122103	P688N-001	D6-103	CUB6D1	GP-1000	GEM-621	6TM-D1	
C128	10000		21R482726	BPD-01	DD-103	BYA6S1	ED-01	DC511	5HK-S1	
C129	680		21K745738	1464-00068		1R5T68	CY15C681J		MS-368	5%
C130	680		21K745738	1464-00068		1R5T68	CY15C681J		MS-368	5%
C131A	1000		21R401058	BPD-2X001	DD2-102	BYC6DD1	ED2-001	DCD521	5HK-2D1	
B	1000									
C132	25000		21K740806						TG-S25	
C133	50000		21K542384	BPD-05	DF-503				TG-S50	
C134	50000		21K542384	BPD-05	DF-503				TG-S50	

REMOTE RECEIVER
PARTS LIST AND DESCRIPTIONS (Continued)
CONTROLS

ITEM No.	RATING		REPLACEMENT DATA					INSTALLATION NOTES
	RESISTANCE	WATTS	MOTOROLA PART No.	CENTRALAB PART No.	CLAROSTAT PART No.	IRC PART No.	MALLORY PART No.	
R117A B	1meg Shaft	½	18K740893	BX-69 Not Req.	A47-1meg-S FKS-1/4	Q11-137 Not Req.	TA16L Not Req.	Sensitivity

RESISTORS

All wattages 1/2 watt, or less, unless otherwise listed.

ITEM No.	RATING		MOTOROLA PART No.	NOTES
	OHMS	WATT		
R118	180K		6K125531	
R119	3900Ω		6K127515	
R120	1200Ω		6K119925	
R121	2.2meg		6K127001	
R122	3900Ω		6K127515	
R123	100K		6K125534	
R124	82Ω		6K127516	
R125	2.2meg		6K127001	
R126	180K		6K125531	
R127	82Ω		6K127516	Note 1
R128	470K		6K125533	
R129	3900Ω	2	6K119927	
R130	33K	1	6K127634	

ITEM No.	RATING		MOTOROLA PART No.	NOTES
	OHMS	WATT		
R131	470Ω		6K127633	
R132	2.2meg		6K127001	
R133	2.2meg		6K127001	
R134	2.2meg		6K127001	
R135	2.2meg		6K127001	
R136	560K		6K127631	
R137	560K		6K127631	
R138	1meg		6K127630	
R139	8200Ω	1	6K125833	
R140	1meg		6K127630	
R141	33K		6K127632	
R142	1000Ω	3	17K537732	
R143	150Ω		65A633275	

Note 1. Not used in some versions.

TRANSFORMER (POWER)

ITEM No	RATING			REPLACEMENT DATA						
	PRI.	SEC. 1	SEC. 2	MOTOROLA PART No.	Halldorson PART No.	Merit PART No.	Ram PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.
T6	117V @ 2.7A	300V @ .022A tap @ 30V @ .001A	6.3V @ 1.9A	25C745626						

COILS (RF-IF)

ITEM No.	USE	REPLACEMENT DATA					NOTES
		MOTOROLA PART No.	Meissner PART No.	Merit PART No.	Miller PART No.	Ram PART No.	
L38	40KC Input Coil	24K746140					
L39	40KC Output Coil	24B745791					
L40	120KC Discriminator	24D745749					Note 1

Note 1 Alternate part #24C745749.

RECTIFIERS

ITEM No.	RATING	REPLACEMENT DATA					NOTES
	CURRENT (Measured)	MOTOROLA PART No.	FEDERAL PART No.	GENERAL ELECTRIC PART No.	INTERNATIONAL PART No.	SARKES TARZIAN PART No.	
M15	.042A	48K127587 ①	1068 ①		6RS100A ①	58D ①	① Selenium type.
M16	.042A	48K127587 ①	1068 ①		6RS100A ①	58D ①	
M17	.001A	48B742698 ①	K1616 ①		2V1 ①	Model 12 ①	

MISCELLANEOUS

ITEM No.	PART NAME	MOTOROLA PART No.	NOTES
M18	Relay	80C745627	On-off
M19	Relay	80A743105	Channel Selector
M20	Microphone	50B745625	Includes cable &plug

REMOTE TRANSMITTER
PARTS LIST AND DESCRIPTIONS
TRANSISTORS

ITEM No	ORIG. TYPE	USE	REPLACEMENT DATA				NOTES
			CBS PART No.	RCA PART No.	RAYTHEON PART No.	SYLVANIA PART No.	
X1	2N270	Remote Control Osc.		2N270			

FIXED CAPACITORS

Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING		REPLACEMENT DATA							NOTES
	CAP.	VOLT	MOTOROLA PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ERIE PART No.	MALLORY PART No.	SPRAGUE PART No.	
C135	200000		8R127645							
C136	7000		8R127648							10%
C137	50000		21K542384						TG-S50	
C138	10000		21K740833						TG-S10	

RESISTORS

All wattages 1/2 watt, or less, unless otherwise listed.

ITEM No.	RATING		MOTOROLA PART No.	NOTES
	OHMS	WATT		
R144	56K		6K127541	
R145	8200Ω		6K119931	

ITEM No.	RATING		MOTOROLA PART No.	NOTES
	OHMS	WATT		
R146	150Ω		6K124797	

REMOTE TRANSMITTER
PARTS LIST AND DESCRIPTIONS (Continued)

COILS (RF-IF)

ITEM No.	USE	REPLACEMENT DATA					
		MOTOROLA PART No.	Meissner PART No.	Merit PART No.	Miller PART No.	Ram PART No.	NOTES
L41	38.5KC Osc.	50D746067					Complete Assy.
L42	41.5KC Osc.	50K746068					Complete Assy.

BATTERIES

ITEM No.	VOLTAGE	MOTOROLA PART No.	REPLACEMENT DATA								NOTES
			BURGESS		EVEREADY		MALLORY		RAY-O-VAC		
			"A"	"B"	"A"	"B"	"A"	"B"	"A"	"B"	
M21	22½			U-15		#412		M-412R or M-215		215	

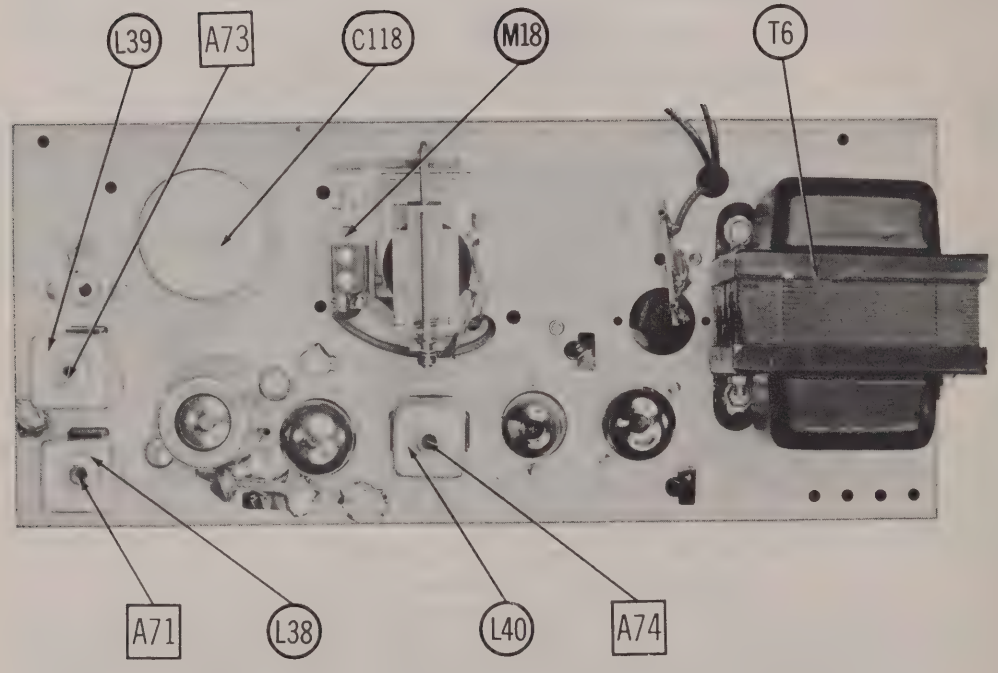
MISCELLANEOUS

ITEM No.	PART NAME	MOTOROLA PART No.	NOTES
M22	Switch	40A745643	Channel Selector, On-off (leaf type)
M23	Switch	40A745648	Remote control, On-off (located in transmitter holder)

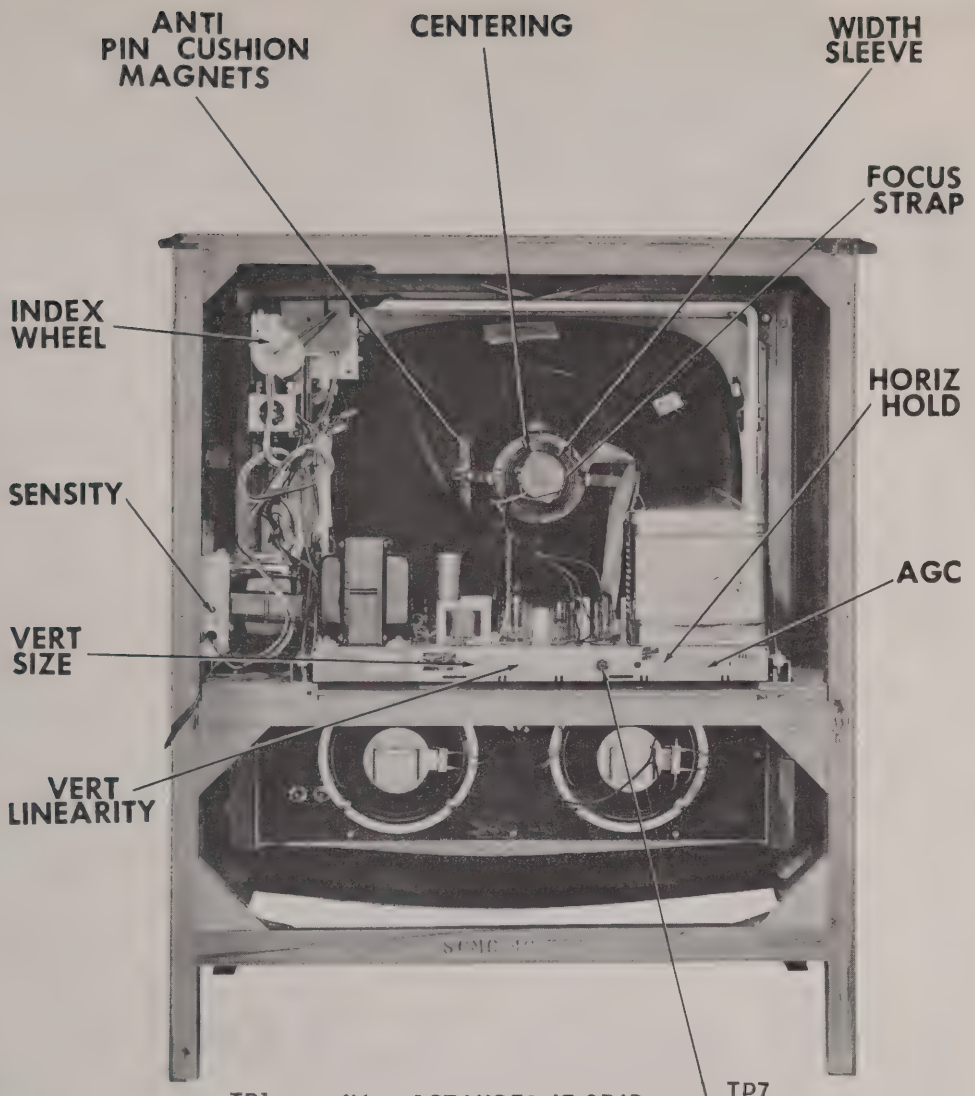
CABINETS & CABINET PARTS

(When Ordering Cabinets & Cabinet Parts, Specify Model, Chassis & Color)

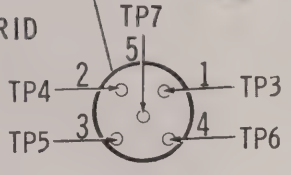
NAME	PART NO.	DESCRIPTION
Pushbutton	38B745745	Channel Selector
Pushbutton	38B745812	On-off
Cabinet	16D745739	Transmitter



REMOTE RECEIVER TOP VIEW



TP1	-.6V	1ST VIDEO IF GRID
TP2	-.1V	VIDEO DET
TP3	-.6V	AGC
TP4	210V	HORIZ OSC
TP5	0V	GROUND
TP6	-1V	HORIZ AFC
TP7	250V	B+



CABINET—REAR VIEW

HORIZONTAL SWEEP CIRCUIT ADJUSTMENTS

Turn the set on and tune in a TV station, preferably with a test pattern. Adjust the brightness and contrast controls for a normal picture.

Short out the AFC voltage by connecting a clip lead from TP3 to chassis. Connect a .1mfd, 400 volt capacitor from TP4 to chassis.

Adjust horizontal hold to the point where the picture is almost stable horizontally.

Remove the capacitor from TP4 and adjust the horizontal frequency slug (B1) to the point where the picture is almost stable horizontally.

Remove the clip lead from TP3 and chassis. Adjust the horizontal hold control until the picture is synchronized horizontally.

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3924 MEADE ST.
DENVER, COLORADO

SERVICING IN THE FIELD

TUNER OSCILLATOR ADJUSTMENTS

Touch-up adjustment of the VHF oscillator is possible by removing the channel selector and fine tuning knobs. On some models it is necessary to remove the trim cover over the knobs by prying it off. Set the fine tuning to the center of its range. The adjustments are located in a circle around the shaft and should be adjusted in sequence from the highest to the lowest channel operating in the area. Adjust for best picture and sound.

PICTURE TUBE SAFETY GLASS CLEANING

Remove the on-off-volume and contrast knobs. Remove the knob cover by prying if off. Remove the channel selector and fine tuning knobs. Remove 3 screws holding the side knob cover. Remove 4 screws holding the safety glass retainer. Remove the safety glass.

SPECIAL ADJUSTMENTS

A. AGC
Observe the picture and advance the AGC control to a point where the picture distorts or a buzz is heard in the sound. Back off from this setting until the picture becomes stable with no noise in the sound.

B. Focus
The focus may be varied by the position of a strap on the base of the picture tube. The strap can be connected between pins 6 and 1 or 6 and 10. Readjust the ion trap for the best focus consistent with maximum brightness.

C. Width
The width may be varied by means of a metallic sleeve located between the yoke and the picture tube neck. Adjust sleeve in or out of the yoke for a picture SLIGHTLY larger than necessary to fill the screen.

HORIZONTAL OSCILLATOR FIELD ADJUSTMENTS

For adjustment of the horizontal oscillator, it is necessary to remove the rear cover and supply power to set. Set the horizontal hold at the center of its range and adjust the horizontal frequency slug (B1) until the picture synchronizes horizontally.

FUSES

Three fuses are used. One for horizontal sweep circuit protection, one for LV power supply protection and one for filament protection. (For location, see tube placement chart).

CENTERING

Centering is accomplished mechanically by adjusting two magnetic rings around the neck of the picture tube. Rotate the two rings around the neck of the tube until the picture is properly centered.

PINCUSHION CORRECTION

Reduce the picture size so that the sides of the raster are visible. Position the 2 magnets so that all sides are straight.

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DENVER, COLORADO

PHOTOFACT* Folder

PACKARD-BELL MODELS 21DC5, 21DC6, 21DC7, 24DC4 (Ch. 98D3)

PACKARD-BELL MODELS 21DC5, 21DC6, 21DC7, 24DC4 (Ch. 98D3)

MODEL 21DC6 (Ch. 98D3)

DISASSEMBLY INSTRUCTIONS

CHASSIS REMOVAL

1. Remove 9 wood screws from the rear cover. Remove the rear cover.
2. Remove the speaker leads.
3. Remove 1 metal screw from the top chassis brace.
4. Remove 3 chassis bolts from the bottom.
5. Remove the chassis.

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3924 MEADE ST.
DENVER, COLORADO

TRADE NAME	Packard-Bell	MODELS	CHASSIS
		21DC5, 21DC6, 21DC7, 24DC4	98D3
		Remote Control ... Model RM-200	
MANUFACTURER	Packard-Bell Co. - Service Div., 11th. & Hope Streets, Los Angeles 15, Calif.		
TYPE SET	Television Receiver With Remote Control		
TUBES	Nineteen		
POWER SUPPLY	110-120 Volts AC, 60 Cycle RATING 240 Watts, 2.2 Amp. @ 117 Volts AC NOTE: Due to circuitry, this receiver draws .040 Amp. (4 Watts) in "OFF" position.		
TUNING RANGE	Channels 2 thru 13 VHF, Video IF 45.75MC, Sound IF 41.25MC (Intercarrier)		

SERVICING IN THE FIELD

TUNER OSCILLATOR ADJUSTMENTS

Touch-up adjustment of the VHF oscillator is possible by removing the rear cover and suppling power to the receiver. Set the fine tuning at the center of its range. The adjustments are accessible, one at a time, thru a hole in the right side of the tuner rear cover as viewed from the rear. Adjust for best picture and sound.

PICTURE TUBE SAFETY GLASS CLEANING

Remove 3 wood screws from the trim strip at the top edge of the safety glass. Tilt glass out at the top and lift up to remove.

SPECIAL ADJUSTMENTS

A. AGC
Observe the picture and advance the AGC control to a point where the picture distorts or a buzz is heard in the sound. Back off from this setting until the picture becomes stable with no noise in the sound.

B. ANI
Tune in the strongest station operating in the area. Turn the ANI control fully clockwise, then counter clockwise until the picture begins to distort or jitter. Adjust the control clockwise SLIGHTLY beyond the point where the picture becomes stable.

C. Focus
The focus may be varied by means of a focus control. (For location, see tube placement chart).

HORIZONTAL OSCILLATOR FIELD ADJUSTMENTS

The horizontal frequency coil is used as the horizontal hold control. Adjust the horizontal hold until the picture synchronizes horizontally. (For location, see tube placement chart).

SOUND IF DETECTOR BUZZ ADJUSTMENT

To eliminate sound IF detector buzz, adjust the ratio detector secondary (A13) located on bottom of chassis.

FUSES

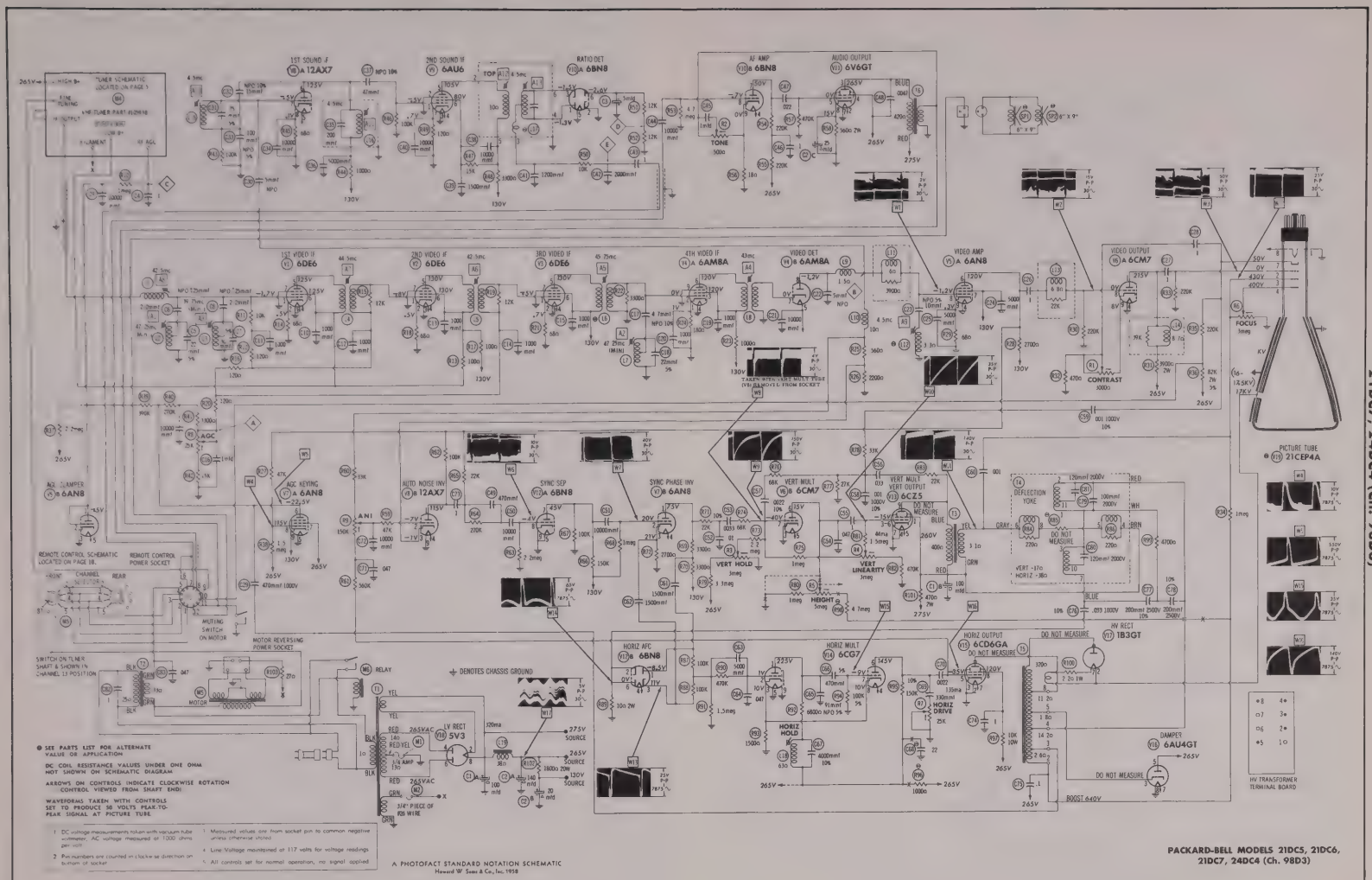
Two fuses are used. One for LV power supply protection, and one for filament protection. (For location, see tube placement chart).

CENTERING

Centering is accomplished mechanically by adjusting two magnetic rings around the neck of the picture tube. Rotate the two rings around the neck of the tube until the picture is properly centered.

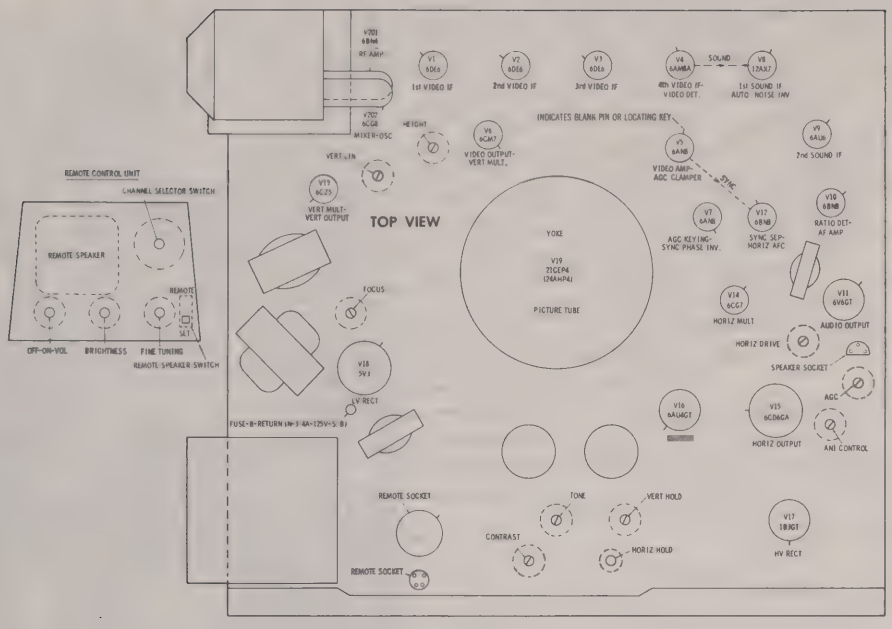
HOWARD W. SAMS & CO., INC. • Indianapolis 5, Indiana

The listing of any available replacement part herein does not constitute in any case a recommendation, warranty or guaranty by Howard W. Sams & Co., Inc., as to the quality and suitability of such replacement part. The numbers of these parts have been compiled from information furnished to Howard W. Sams & Co., Inc., by the manufacturers of the particular type of replacement part listed. Reproduction or use, without express permission, of editorial or pictorial content, in any manner, is prohibited. No patent liability is assumed with respect to the use of the information contained herein. © 1958 Howard W. Sams & Co., Inc., Indianapolis 5, Indiana. Printed in U.S. of America



PACKARD-BELL MODELS 21DC5, 21DC6, 21DC7, 24DC4 (Ch. 98D3)

TUBE PLACEMENT CHART



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TUBE FAILURE CHECK CHART

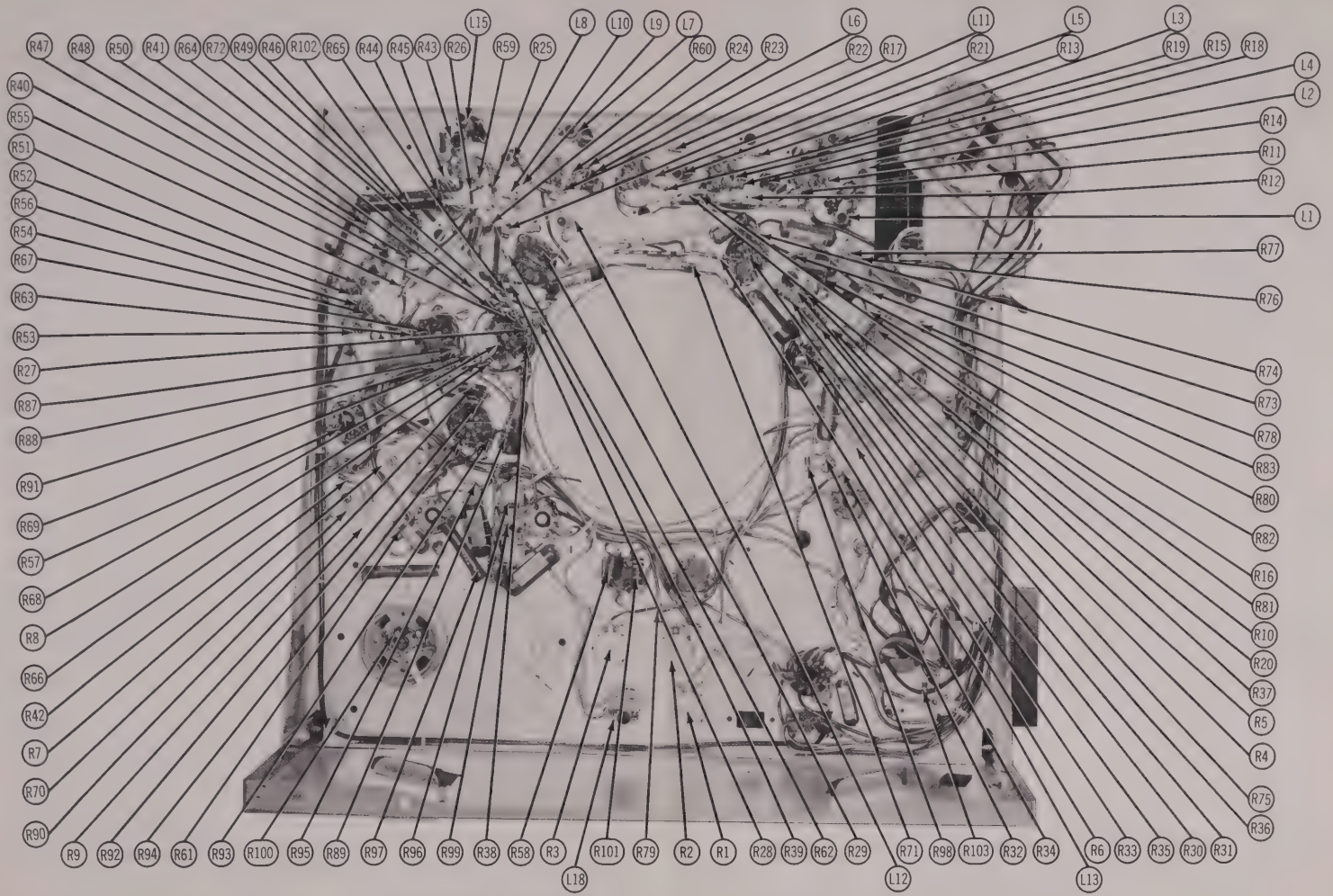
The following chart lists tubes whose failures are most likely to produce the indicated symptoms. Refer to tube placement chart for location and type of tube.

POWER SUPPLY FAILURE
No raster, no sound - **Fuse (M1), V18**

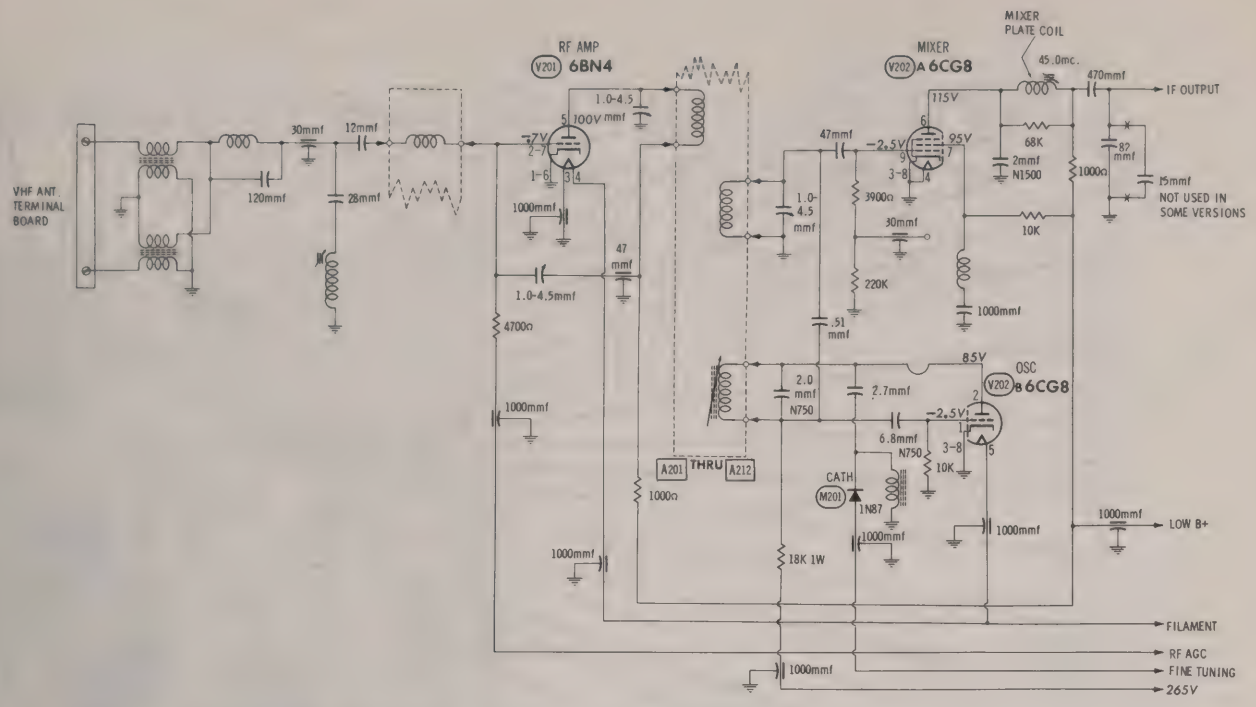
LOSS OF PICTURE OR SOUND
No pic, no sound, has raster - **V1, V2, V3, V4**
No pic, no sound, has snow - **V201, V202, V1**
No pic, has sound, has raster - **V5, V6**
Has pic, no sound - **V8, V9, V10, V11**
Overloaded picture - **V7, V5**

SYNC FAILURE
No vert. sync - **V8, V12, V7**
No horiz. sync - **V8, V12, V7**
No vert. or horiz. sync - **V8, V12, V7**

SWEEP FAILURE
No raster, has sound - **V12, V14, V15, V16, V17, V19**
No vertical deflection - **V6, V13**
Poor vert. linearity or foldover - **V6, V13**
Poor horiz. linearity or foldover - **V14, V15, V16**
Narrow picture - **V14, V15, V16, V18**
Vert. off freq. - **V6, V13**
Horiz. off freq. - **V14**



CHASSIS BOTTOM VIEW-RESISTOR AND INDUCTOR IDENTIFICATION



A PHOTOFACT STANDARD NOTATION SCHEMATIC
Howard W. Sams & Co., Inc. 1958

.VHF TUNER PART #10593B

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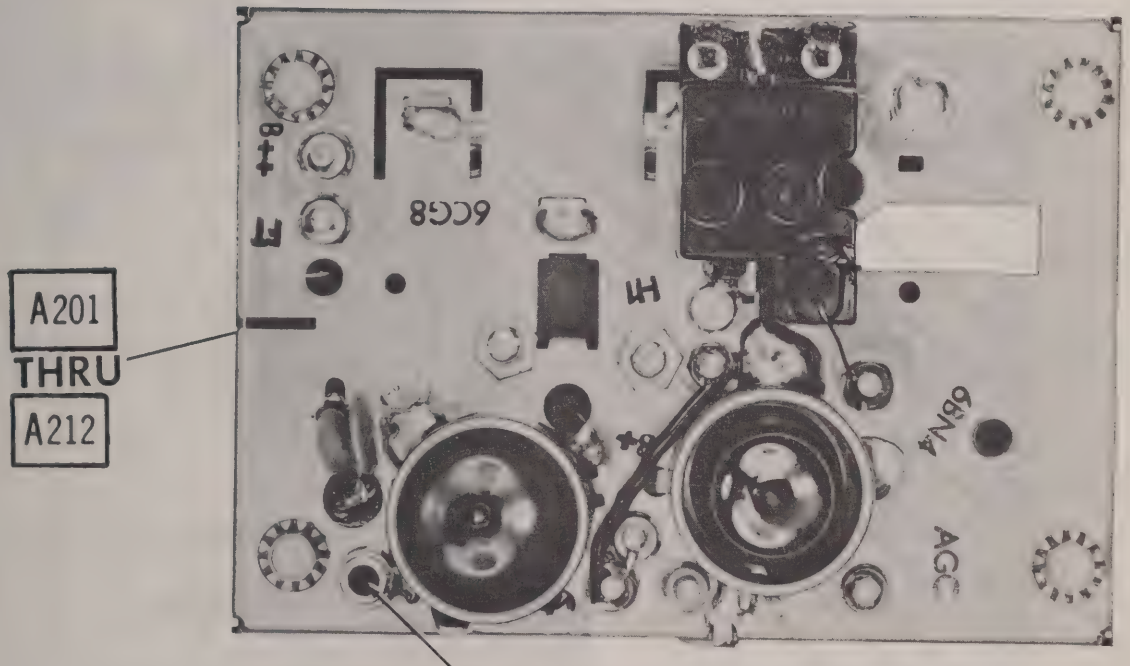
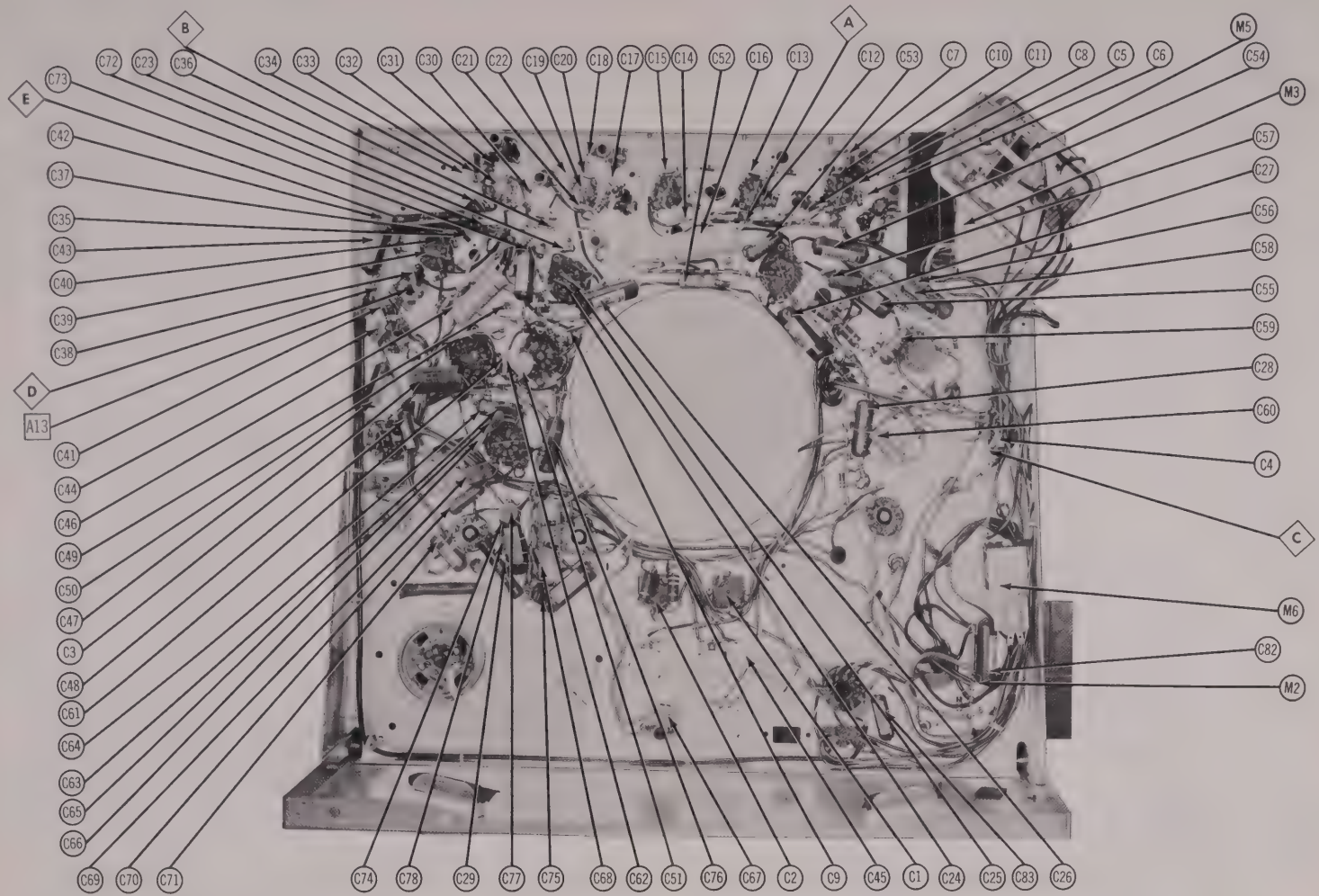
TUNER SCHEMATIC



MIXER PLATE COIL

TUNER-TOP VIEW



CHASSIS BOTTOM VIEW-CAPACITOR AND ALIGNMENT IDENTIFICATION

ALIGNMENT INSTRUCTIONS

PRE-ALIGNMENT INSTRUCTIONS

The high voltage lead should be securely taped and kept away from the chassis.
Allow a 20 minute warm-up period for the receiver and test equipment.

VIDEO IF ALIGNMENT

Remove the Anti-Noise Inverter tube (12AX7, V8) from its socket.
Connect the negative lead of a 4.5 volt bias supply to point Ⓐ. Positive to chassis.
Set the generator output at maximum for the first two steps.
Connect the synchronized sweep voltage from the sweep generator to the horizontal input of the oscilloscope for horizontal deflection.
The sweep generator output lead should be terminated with its characteristic impedance, usually 50 ohms.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
1.	Direct	High side to ungrounded tube shield floating over mixer-osc. tube (V202). Low side to chassis.	Not used	47.25MC (Unmod)	Any non-interfering channel	USE VTVM. DC probe to point Ⓑ. Common to chassis. (Across video det. load).	A1, A2	Adjust for MINIMUM deflection.
2.	"	"	"	39.75MC	"	"	A3	"
3.	"	"	"	43.3MC	"	"	A4	Adjust for maximum deflection. Reduce generator output to maintain $2\frac{1}{2}$ - 3 volt deflection.
4.	"	"	"	45.75MC	"	"	A5	"
5.	"	"	"	42.5MC	"	"	A6	"
6.	"	"	"	44.5MC	"	"	A7	"
7.	"	"	"	42.5MC	"	"	A8	"
8.	"	"	"	45.0MC	"	"	Mixer Plate Coil	Adjust for maximum deflection. Reduce generator output to maintain $2\frac{1}{2}$ - 3 volts deflection. Repeat steps 1 thru 8.
9.	Two 120Ω Carbon Resistors	Across antenna terminals with 120Ω in each lead.	63MC (10MC Swp)	41.25MC 43.0MC 45.0MC 45.75MC 47.25MC	3	Vert. Amp. thru 22K to point Ⓑ. Low side to chassis. (Across video det. load). DC probe of VTVM to point Ⓒ. Common to chassis.		Connect a 1mfd capacitor from point Ⓒ to chassis. Adjust sweep generator output to provide a reading on the VTVM of approximately -4 volts. Connect high side of a separate marker generator to the ground lead of the IF input cable. Check for response similar to Fig. 1. If necessary, make SLIGHT readjustment of A1 thru A8 for desired response. Disconnect scope, marker generator and capacitor. Reduce sweep to zero, but do not change frequency. Adjust AGC control (R8) for -$5\frac{1}{2}$ volts on VTVM at point Ⓒ. This will be the normal AGC setting. Replace V8 in its socket.

4.5MC TRAP ALIGNMENT

Remove the video detector tube (V4) from its socket.
Turn the contrast control fully clockwise.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	CHANNEL	CONNECT VTVM	ADJUST	REMARKS
10.	.001mfd	High side to point Ⓑ. Low side to chassis.	4.5MC (Unmod)	Any non-interfering channel	RF probe to pin 7 (cathode) of picture tube. Common to chassis.	A9	Adjust for MINIMUM deflection. Replace V4 in its socket.

If signal generator of crystal accuracy capable of at least one (1) volt output is not available, A9 must be adjusted using station signal. Detune fine tuning to accentuate 4.5MC beat pattern in picture. Adjust A9 for MINIMUM beat in the picture.

SOUND IF ALIGNMENT

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	CHANNEL	CONNECT VTVM	ADJUST	REMARKS
11.	.001mfd	High side to point Ⓑ. Low side to chassis.	4.5MC (Unmod)	Any non-interfering channel	DC probe to pin 6 (plate) of 6BN8 (V10). Common to chassis.	A10, A11, A12	Adjust for maximum deflection.
12.	"	"	"	"	DC probe to point Ⓓ. Common to point Ⓔ.	A13	Adjust for zero reading. A positive and negative reading will be obtained on either side of the correct setting. Repeat steps 11 and 12.

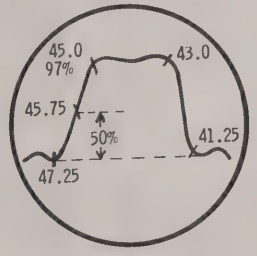


FIG.1

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PARTS LIST AND DESCRIPTIONS

TUBES (GENERAL ELECTRIC, SYLVANIA)

ITEM No.	USE	TYPE	NOTES
V1	1st Video IF Amp	6DE6	
V2	2nd Video IF Amp	6DE6	
V3	3rd Video IF Amp	6DE6	
V4	4th Video IF Amp - Video Det	6AM8A	
V5	Video Amp -AGC Clamper	6AN8	
V6	Video Output-Vert Mult	6CM7	
V7	AGC Keying-Sync Phase Inv	6AN8	
V8	1st Sound IF Amp - Auto Noise Inv	12AX7	
V9	2nd Sound IF Amp.	6AU6	
V10	Ratio Det -AF Amp.	6BN6	
V11	Audio Output	6V6GT	
V12	Sync Sep -Horiz. AFC	6BN8	
V13	Vert Mult - Vert Output	6CZ5	
V14	Horiz Mult.	6CG7	
V15	Horiz Output	6CD6GA	
V16	Damper	6AU4GT	
V17	HV Rectifier	1B3GT	
V18	I.F Rectifier	5V3	

PICTURE TUBE

ITEM No.	REPLACEMENT DATA			NOTES
	Packard-Bell PART No.	GENERAL ELECTRIC PART No.	RCA PART No.	SYLVANIA PART No.
V19	21CEP4		21CEP4 ①	21CEP4 ②
	24AHP4		24AHP4 ①	

① "Silverama"
② "Silver Screen 85"

ELECTROLYTIC CAPACITORS

ITEM No.	RATING CAP	RATING VOLT	REPLACEMENT DATA Packard-Bell PART No.	AEROVOX PART No.	CORNELL DUBILIER PART No.	MALLORY PART No.	PYRAMID PART No.	SANGAMO PART No.	SPRAGUE PART No.
C1A	400	350	34148	AFH4-35-80	BG323	FP27.7	TMT-190	T-537	*T2597
B	40	350			BBR25-25	TC26	TD-100-450	MT-4580	
C	25	25							
C1A	140	350	34113	AFH3-29-75	CG237	FP31.6	TMT-164	T-180	*R2485
B	30	350						MT-4530	
C2	5	50	34038	PR850V5	BBR5-50	TC30	TD-5-50	MT-0504	TVA-1303

FIXED CAPACITORS

Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING CAP	RATING VOLT	REPLACEMENT DATA Packard-Bell PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ERIE PART No.	MALLORY PART No.	SPRAGUE PART No.	NOTES
C4	.1	300	23107	P388N-1	DF-104	CUB2P1		GEM-201	2TM-P1	
C5	23			TCS-23	23R5Q23	CY10C230J			MS-422	5%
C6	2.3		23986	TCS-2R3		TCO-2.3				NPO
										a . 35mmf
C7	30			TCS-30	23R5Q8	CY10C300J			MS-43	5%
C8	3.3		23988	TCS-3R3		TCO-3.3				NPO
										a . 35mmf
C9	10000		23939	BPD-01	DD-103	BYA5S1	ED-01	DC51J	5HK-S1	
C10	1000		23980	BPD-001	DD-102	BYA5S1X	ED-1000	DC52J	5HK-D1	
C11	1000		23980	BPD-001	DD-102	BYA5S1X	ED-1000	DC52J	5HK-D1	
C12	1000		23980	BPD-001	DD-102	BYA5S1X	ED-1000	DC52J	5HK-D1	
C13	1000		23980	BPD-001	DD-102	BYA5S1X	ED-1000	DC52J	5HK-D1	
C14	1000		23980	BPD-001	DD-102	BYA5S1X	ED-1000	DC52J	5HK-D1	
C15	1000		23980	BPD-001	DD-102	BYA5S1X	ED-1000	DC52J	5HK-D1	
C16	1	100	23040	P388N-1.0		CUB2W1		GEM-S1	2TM-M1	
C17	4.7		23978	TCS-4R7	23R5Q47	CY04C47J	TCO-4.7	GP-5547	STCCB-V47	NPO 10%
C18	22			1469-00022	TCS-22	23R5Q22			MS-422	5%
C19	1000		23980	BPD-001	DD-103	BYA5S1X	ED-1000	DC52J	5HK-D1	
C20	1000		23980	BPD-001	DD-103	BYA5S1X	ED-1000	DC52J	5HK-D1	
C21	10000		23939	BPD-01	DD-103	BYA5S1	ED-01	DC51J	5HK-S1	
C22	5		23908	WPO-DI 5.0	TCS-4R7	CDV5C	TCO-5		STCCB-V47	NPO
C23	10		23927	WPO-SI 10	TCZ-10		TCO-10			NPO 5%
C24	5000		23931	BPD-005	DD-503	BYA10D5	ED-005	DC525	5HK-D5	
C25	5000		23931	BPD-005	DD-503	BYA10D5	ED-005	DC525	5HK-D5	
C26	.1	600	23145	P568N-1	DF-104	CUB5P1		GEM-601	6TM-P1	
C27	.1	600	23145	P568N-1	DF-104	CUB5P1		GEM-601	6TM-P1	
C28	.1	400	23138	P488N-1	DF-104	CUB4P1		GEM-401	4TM-P1	
C29	470	1000	23967	BYD-15-470	DD-471	BYA10T47	HR5-470	DC5347	SGA-T47	
C30	8		23906	WPO-DI 5.0	TCS-4R7	CDV5C	TCO-5		STCCB-V47	NPO
C31	75			1469-00075	TCZ-75	23R5Q75			MS-475	5%
C32	33		23933	WPO-DI 18	TCZ-15	CO45C	TCO-15		STCC-Q15	NPO 10%
C33	200		23941		TCZ-100		TCO-100			NPO 5%
C34	10000		23939	BPD-01	DD-103	BYA5S1	ED-01	DC51J	5HK-S1	
C35	300			1485-0003	DB-301	5WT2	ED-300	MC347	1FM-32	
C36	5000		23931	BPD-005	DD-503	BYA10D5	ED-005	DC525	5HK-D5	
C37	47		23933	WPO-DI 47	TCZ-47	CDV5C	TCO-47		STCC-Q47	NPO 10%
C38	10000		23939	BPD-01	DD-103	BYA5S1	ED-01	DC51J	5HK-S1	
C39	1500		23936	BPD-0015	DD-152	BYA10D15	ED-1500	DC5215	5HK-D15	
C40	10000		23939	BPD-01	DD-103	BYA5S1	ED-01	DC51J	5HK-S1	
C41	1200		23988	DI -0012	DD-122	L20D12	ED-1200	UC-5212	SGA-D12	
C42	3000		23937	BPD-003	DD-303	BYA10D3	ED-003	DC532	SGA-D32	
C43	.1	200	23107	P288N-1	DF-104	CUB2P1		GEM-201	2TM-P1	
C44	10000		23939	BPD-01	DD-103	BYA5S1	ED-01	DC51J	5HK-S1	
C45	1.0	100	23040	P288N-1.0		CUB2W1		GEM-S1	2TM-M1	
C46	.1	600	23145	P568N-1	DF-104	CUB5P1		GEM-601	6TM-P1	
C47	.022	400	23133	P468N-022	DD-303	CUB4S22	ED-303	GEM-4122	4TM-S22	
C48	.0047	600	23137	P568N-0047	DE-472	CUB6D47	GP-4700	GEM-6247	6TM-D47	
C49	470		23916	BPD-0047	DD-471	BYA10T47	ED-470	UC-5347	SGA-T47	
C50	5000		23939	BPD-01	DD-103	BYA5S1	ED-01	DC51J	5HK-S1	
C51	10000		23939	BPD-01	DD-103	BYA5S1	ED-01	DC51J	5HK-S1	
C52	.01	600	23139	P568N-01	DE-103	CUB5E1	GP-10000	GEM-611	6TM-E1	
C53	.033	600	23336					GEM-16333		10%
C54	.047	600	23143	P568N-047	DF-503	CUB5S47		GEM-6147	6TM-S47	
C55	.1	600	23145	P568N-1	DF-104	CUB5P1		GEM-601	6TM-P1	
C56	.033	600	23143	P568N-033	DF-303	CUB5S33		GEM-6133	6TM-S33	
C57	.0022	400	23316							10%
C58	.001	1000	23753							10%
C59	.001	1000	23753							10%
C60	.001	600	23183	P568N-001	DE-102	CUB6D1	GP-1000	GEM-621	6TM-D1	
C61	1500		23916	BPD-0015	DD-152	BYA10D15	ED-1500	DC5215	5HK-D15	
C62	1500		23916	BPD-0015	DD-152	BYA10X15	ED-1500	DC525	5HK-D15	
C63	5000		23931	BPD-005	DD-503	BYA10D5	ED-005	DC525	5HK-D5	
C64	.047	200	23106	P288N-047	DF-503	CUB2S47		GEM-6147	2TM-S47	
C65	18		23919							NPO 5%
C66	470		23286			SRS747	CY15C47J		MS-347	5%
C67	6000		23306			1R5D4		MCB463	MS-24	10%
C68	.22	400		P488N-22		CUB4P23		GEM-4022	4TM-P22	①
C69	330		23232	1469-00033		SRS733	CY15C331K		MS-333	10%
C70	.0022	600	23133	P568N-0022	DE-222	CUB5D22	GP-2200	GEM-6222	6TM-D22	
C71	.047	200	23106	P288N-047	DF-503	CUB2S47		GEM-6147	2TM-S47	
C72	10000		23939	BPD-01	DD-103	BYA5S1	ED-01	DC51J	5HK-S1	
C73	.1	200	23107	P288N-1	DF-104	CUB2P1		GEM-201	2TM-P1	
C74	.1	600	23145	P568N-1	DF-104	CUB6P1		GEM-601	6TM-P1	

① Not used in some versions.

CAPACITORS (cont)

ITEM No.	RATING CAP	RATING VOLT	REPLACEMENT DATA Packard-Bell PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ERIE PART No.	MALLORY PART No.	SPRAGUE PART No.	NOTES
C75	.1	600	23145	P568N-1	DF-104	CUB6P1		GEM-601	6TM-P1	
C76	033	1000	23074							10%
C77	200	2500	23959							10%
C78	300	2500	23960							10%
C79	100	2500								
C80	120	2000								
C81	120	2000								
C82	.1	600	23745	P568N-1	DF-104	CUB6P1		GEM-601	6TM-P1	
C83	.047	200	23105	P288N-047	DF-503	CUB2S47		GEM-6147	2TM-S47	

① Not used in some versions.

CONTROLS

ITEM No.	RATING RESISTANCE	RATING WATTS	REPLACEMENT DATA Packard-Bell PART No.	CENTRALAB PART No.	CLAROSTAT PART No.	IRC PART No.	MALLORY PART No.	INSTALLATION NOTES
R1	3000Ω	½	25045	B-705	A47-500-S	C37-112	U9	Contrast
R2A	500Ω	½	25523	B-4	A47-500-S	Q31-103	U9	Tone
B	Shaft			Not Req.	B2S-3	Not Req.	Not Req.	
R3A	3meg	½	25523	AB-38	A47-3meg-S	Q31-140	U97	Vert. Hold
B	Shaft			AK-11	B2S-3	Not Req.	Not Req.	
R4A	2meg	½	25567	AB-34	A47-2meg-S	Q31-140	TA301	Vert. Lin.
B	Shaft			AK-1	FK2-1/4	RQ	Not Req.	
R5A	5meg	½	25510	AB-37	A47-5meg-S	Q31-141	TT4561	Height
B	Shaft			AK-1	FK2-1/4	RQ	Not Req.	
R6A	3meg	½	25567	AB-34	A47-3meg-S	Q31-140	TA301	Focus
B	Shaft			AK-1	FK2-1/4	RQ	Not Req.	
R7A	25K	½	25557	AB-36	A47-25K-S	Q31-130	TA3031	Horiz. Drive
B	Shaft			AK-1	FK2-1/4	RQ	Not Req.	
R8A	25K	½	25557	AB-36	A47-25K-S	Q31-130	TA3031	AGC
B	Shaft			AK-1	FK2-1/4	RQ	Not Req.	
R9A	150K	½	25921	AB-43	A47-150K-S	Q31-138	TA1041	ANT
B	Shaft			AK-1	FK2-1/4	RQ	Not Req.	

RESISTORS

All wattages 1/2 watt, or less, unless otherwise listed.

ITEM No.	RATING OHMS	RATING WATT	Packard-Bell PART No.	NOTES
R10	1meg		73161	
R11	10K		73037	
R12	120Ω		73045	
R13	100Ω		73013	
R14	68Ω		73011	
R15	12K		73038	
R16	120Ω		73014	
R17	100Ω		73013	
R18	68Ω		73011	
R19	12K		73038	
R20	120Ω		73014	
R21	68Ω		73011	
R22	3300Ω		73031	
R23	100Ω		73025	
R24	180Ω		73016	
R25	560Ω		73022	
R26	2200Ω		73029	
R27	47K		73046	
R28	470Ω		73030	
R29	68Ω		73011	
R30	220K		73153	
R31	3900Ω	2	73433	
R32	470Ω		73031	
R33	220K		73153	
R34	1meg		73161	
R35	220K		73153	
R36	82K 5%	2	73448	
R37	2.2meg		73065	
R38	1.5meg		73063	
R39	390K		73056	
R40	270K		73054	
R41	3300Ω		73031	
R42	15K		73039	
R43	68Ω		73149	
R44	1000Ω		73025	
R45	68Ω		73011	
R46	100K		73149	
R47	15K		73039	
R48	3300Ω		73031	
R49	120Ω		73014	
R50	10K		73037	
R51	15K		73038	
R52	12K		73038	
R53	4.7meg		73169	
R54	220K		73153	
R55	220K		73153	
R56	18Ω		73004	

ITEM No.	RATING OHMS	RATING WATT	Packard-Bell PART No.	NOTES
R57	470K		73157	
R58	5600	2	73422	
R59	47K		73045	
R60	33K		73043	
R61	560K		73058	
R62	100K		73149	
R63	2.2meg		73065	
R64	270K		73054	
R65	22K		73041	
R66	150K		73051	
R67	100K		73049	
R68	1meg		73161	
R69	33000		73031	
R70	33000		73031	
R71	33K		73041	
R72	2700Ω		73030	
R73	2.2meg		73065	
R74	68K		73047	
R75	1meg		73161	
R76	68K		73047	
R77	27K		73042	
R78	33K		73043	
R79	2.2meg		73067	
R80	1meg		73161	
R81	1.5meg		73163	
R82	470K		73157	
R83	22K		73041	
R84	2200			Note 1
R85				
R86	220Ω			
R87	100K		73049	
R88	100K		73049	
R89	10Ω	2	73401	
R90	470K		73157	
R91	100K		73163	
R92	68000Ω		73035	
R93	1500Ω		73037	
R94	100K 5%		73049-1	
R95	150K		73051	
R96	1000Ω			Note 2
R97	10K	10	73707	
R98	4.7meg		73169	Note 3
R99	47000Ω		73033	
R100	2.2Ω	1	73719	
R101	470Ω	2	73421	
R102	1800Ω	20	73673	
R103	27Ω		73006	

Note 1. Temperature compensating resistor used in some versions.
Note 2. Not used in some versions.

TRANSFORMER (POWER)

ITEM No.	RATING PRI.	RATING SEC. 1	RATING SEC. 2	REPLACEMENT DATA Packard-Bell PART No.	Halldorson PART No.	Merit PART No.	Rem PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.
T1	117V	580VCT	5V	29066						
	②2.2A	③.320A	④3A							
	SEC. 3	SEC. 4	SEC. 5							
	6.3V									
	⑤1.2A									

TRANSFORMER (REMOTE CONTROL)

ITEM No.	RATING PRI.	RATING SEC. 1	RATING SEC. 2	REPLACEMENT DATA Packard-Bell PART No.	Halldorson PART No.	Merit PART No.	Rem PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.
T2	117V	24V		29080-A					23Y53 ①	
	①.34A	②1.7A								

① Drill new mounting hole.

TRANSFORMERS (SWEEP CIRCUITS)

ITEM No.	USE	REPLACEMENT DATA Packard-Bell PART No.	Halldorson PART No.	Merit PART No.	Rem PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.	NOTES
T3	Vert. Output	29453							
T4A	Yoke-Horiz. (28.8MH)	29696 ①							
B	(210°)-Vert. (15MH)								
M4	Rear Cover & Centering Device	34071							
T5	Horiz. Output	29067		HVO-126 ② *		HO-289 ② *		D-95 ②*	

① Includes capacitors C70, C80, C81 and resistors R84 and R86.
② Drill new mounting hole(s).

***HORIZONTAL OUTPUT TRANSFORMER CONNECTION DATA**

Use Original Width Coil Unless Replacement Type Is Listed

ORIGINAL TERMINAL CONNECTIONS	Halldorson Replacement Connections	Merit Replacement Connections	Rem Replacement Connections	Stancor Replacement Connections	Thordarson Replacement Connections	Triad Replacement Connections
8	8	8		8		8
5	5	5		4		4
4	4	4		3		3
3	3	3		2		2
2	2	2		1		1
1	1	1				

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	IMPEDANCE PRI.	IMPEDANCE SEC.	REPLACEMENT DATA Packard-Bell PART No.	Halldorson PART No.	Merit PART No.	Rem PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.	NOTES
T6	4500Ω	3-4Ω	29436-C	21107	A-2930	AU-601	A-3877	24851	S-5LX	

SPEAKER

ITEM No.	TYPE SIZE	TYPE FIELD	TYPE V. C. IMP.	REPLACEMENT DATA Packard-Bell PART No.	QUAM PART No.	NOTES
SP1	6" x 9"	PM	6-8Ω	83113 ① ②	692IZ8 ①	① Phase
SP2	6" x 9"	PM	6-8Ω	83113 ① ③	69AIZ8 ①	② Used in Models 21DC8, 21CC7, 24DC4
	4"	PM		83017 ①		③ Two used in Model 21DC5

COILS (RF-IF)

ITEM No.	USE	REPLACEMENT DATA Packard-Bell PART No.	Meissner PART No.	Merit PART No.	Miller PART No.	Rem PART No.	NOTES
L1	1st. Video IF	29584	17-4534	TV-151		VF-4	
L2	47.25MC Trap	29564A			6235		
L3	43.75MC Trap	29565A			6235		
L4	2nd. Video IF	29585	17-4533	TV-150	6219	VF-3	
L5	3rd. Video IF	29567A	17-4533	TV-150	6219	VF-3	
L6	4th. Video IF	29644	17-4532	TV-130	6216	VF-3	
L7	47.25MC Trap	29564A			6235		
L8	5th. Video IF	29567A	17-4533	TV-150	6219	VF-3	
L9	RF Choke	29566	18-1005	BC-566	4613		10 Microhenries
L10	Shunt Peaking Coil	29609	18-3250	TV-155	6151	VF-5	250 Microhenries
L11	Series Peaking Coil	29562	18-3093 *	TV-181 *	6177 *	VF-2 *	93 Microhenries, wound on 3900Ω resistor
L13	4.5MC Trap	29648	17-3402 ▲		1470		
L14	4.5MC Trap	29565	18-3125 *	TV-182	6178	VF-4 *	120 Microhenries, wound on 22K resistor
L14	Shunt Peaking Coil	29608	18-4180	TV-183	6178	VF-5 †	180 Microhenries, wound on 39K resistor
L15	1st. Sound IF	29563B	20-1004	TV-181	1469	SF-3	
L16	2nd. Sound IF	29576					
L17	Ratio Det.	29694	17-3477				

* Parallel with 3900Ω resistor.
† Parallel with 39K resistor.
▲ Disregard tap.

TRANSFORMER (HORIZ. OSC.)

ITEM No.	DC RES. PRI.	DC RES. SEC.	REPLACEMENT DATA Packard-Bell PART No.	Meissner PART No.	Merit PART No.	Miller PART No.	Rem PART No.	Thordarson PART No.	NOTES
L18	63Ω		29589A	19-1578	TV-153	6210	H-103	HS-5	

FILTER CHOKE

ITEM No.	RATINGS CURRENT (Measured)	RATINGS DC RES.	RATINGS INDUCTANCE (@ CURRENT 1000 Cy.)	REPLACEMENT DATA Packard-Bell PART No.	Halldorson PART No.	Merit PART No.	Rem PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.
L19	.300A	38Ω	.9 Hy.	27006-B	C5037 ①	C-2996 ①		C-2328 ①	26C44 ①	C-27X

① Drill new mounting hole.

FUSES

ITEM No.	TYPE	RATING	Packard-Bell PART No. FUSE	Packard-Bell PART No. HOLDER	LITTELFUSE PART No. FUSE	LITTELFUSE PART No. HOLDER	BUSS PART No. FUSE	BUSS PART No. HOLDER
M1	N	3/4A 125V S/B	45040		333.750	346010	N 3/4	EN 1/8 to 3/4
M2		3/4" Length of #26 Wire						

MISCELLANEOUS

ITEM No.	PART NAME	Packard-Bell PART No.	NOTES
M3	Tuner	10593B	VHF
M4	Centering Device	34071	Includes yoke cover
M5	Motor	58067	24V AC
M6	Relay	72018A	24V SPST

PARTS LIST AND DESCRIPTIONS (Continued)
CABINETS & CABINET PARTS

(When Ordering Cabinets & Cabinet Parts, Specify Model, Chassis & Color)

NAME	PART NO.	DESCRIPTION
Safety Glass	55090	21" Models
Safety Glass	55096A	24" Models
Mask	55091-2A	21" Models
Mask	55097-2A	24" Models
Knob	52179	Contrast, vertical hold, tone
Knob	52180C	Horiz. Hold

WIRING DATA

High Voltage Lead	Use BELDEN No.	8869
Shielded Hook-up Wire	Use BELDEN No.	8885 (Single Conductor) 8738 (Two Conductor)
General-use Unshielded Hook-up Wire	Use BELDEN No.	8530 (Solid) Available in Ten Colors 8524 (Stranded) Available in Ten Colors
Power Cord (Interlock Type)	Use BELDEN No.	8874
300Ω Tuner Input Lead	Use BELDEN No.	8225
300Ω Antenna Lead-in	Use BELDEN No.	8230 or 8275
Antenna Rotor Cable	Use BELDEN No.	8464 (Flat) or 8484 (Round) - 4 Conductor 8485 (Round) - 5 Conductor 8488 (Round) - 8 Conductor

REMOTE CONTROL
PARTS LIST AND DESCRIPTIONS

CONTROLS

ITEM No.	RATING		REPLACEMENT DATA					INSTALLATION NOTES
	RESISTANCE	WATTS	Packard-Bell PART No.	CENTRALAB PART No.	CLAROSTAT PART No.	IRC PART No.	MALLORY PART No.	
R104A	50K	½	25040B	B-32	A47-50K-Z	QI3-123	U33	Volume
B	Shaft			Not Req.	KSS-3	Not Req.	Not Req.	
C	Switch			KB-1 *	SWE-12	76-1	US-26	
R105A	50K	½	25917B	B-31	A47-50K-S	QI1-123	U35	Brightness
B	Shaft			Not Req.	KSS-3	Not Req.	Not Req.	
R106A	50K	½	25946	B-32	A47-50K-Z	QI3-123	U33	Fine Tuning
B	Shaft			Not Req.	KSS-3	Not Req.	Not Req.	

* Use KR-1 on red label control.

SPEAKER

ITEM No.	TYPE			REPLACEMENT DATA		NOTES
	SIZE	FIELD	V. C. IMP.	Packard-Bell PART No.	QUAM PART No.	
SP3	2 1/2"	PM	3-4Ω	83114	25A07	

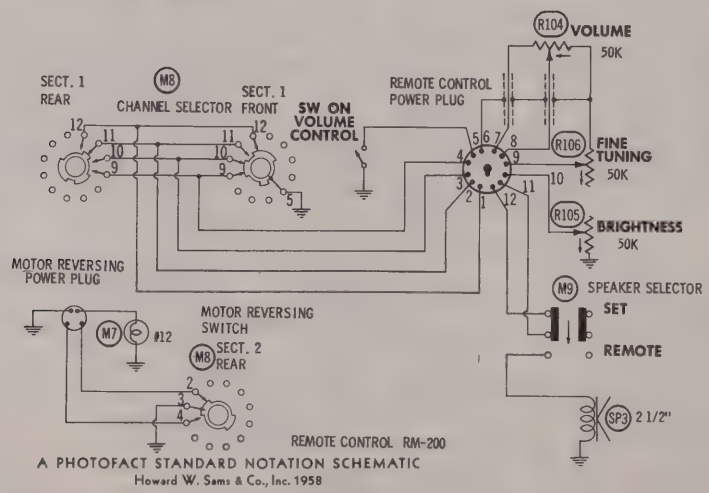
MISCELLANEOUS

ITEM No.	PART NAME	Packard-Bell PART No.	NOTES
M7	Dial Lamp	54008	#12
M8	Switch	86063	Channel Selector (Rotary wafer type)
M9	Switch	86712	Speaker Selector (Slide type DPST)
	Cable	22057A	

CABINETS & CABINET PARTS

(When Ordering Cabinets & Cabinet Parts, Specify Model, Chassis & Color)

NAME	PART NO.	DESCRIPTION
Knob	52217A	Channel Selector
Knob	52220A	On-off-volume, brightness, fine tuning
Cabinet Grille	21135-1B	
Cabinet Shell	21135-2B	
Cabinet Base	21135-3	



REMOTE CONTROL SCHEMATIC

TUNER ALIGNMENT INSTRUCTIONS

PRE-ALIGNMENT INSTRUCTIONS

The high voltage lead should be securely taped and kept away from the chassis.
Allow a 20 minute warm-up period for the receiver and test equipment.

VHF OSCILLATOR ALIGNMENT

Connect variable bias to IF AGC line. Adjust bias to obtain response curve which shows no indication of overloading.
Connect the synchronized sweep voltage from the sweep generator to the horizontal input of the oscilloscope for horizontal deflection.
The sweep generator output lead should be terminated with its characteristic impedance, usually 50 ohms.
Set the fine tuning to the center of its range.
Use only enough sweep generator output to provide a usable pattern on scope.
Use 10MC sweep unless otherwise noted.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
1.	Two 120Ω Carbon Resistors	Across antenna terminals with 120Ω in each lead.	213MC	211.25MC 215.75MC	13	Vert. Amp. thru 47K across video detector load.	A201	Adjust to place sound marker in trap notch as in Fig. 201. Video marker should fall at 50%.
			207MC	205.25MC 209.75MC	12		A202	
			201MC	199.25MC 203.75MC	11		A203	
			195MC	193.25MC 197.75MC	10		A204	
			189MC	187.25MC 191.75MC	9		A205	
			183MC	181.25MC 185.75MC	8		A206	
			177MC	175.25MC 179.75MC	7		A207	
			85MC	83.25MC 87.75MC	6		A208	
			79MC	77.25MC 81.75MC	5		A209	
			69MC	67.25MC 71.75MC	4		A210	
			63MC	61.25MC 65.75MC	3		A211	
			57MC	55.25MC 59.75MC	2		A212	

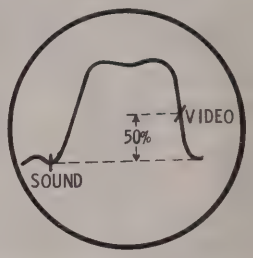


FIG. 201

VHF RF AND MIXER ALIGNMENT

This portion of the receiver has been properly aligned at the factory and is very stable. Alignment of this portion should not be required in the field.

TUNER PARTS LIST & DESCRIPTION

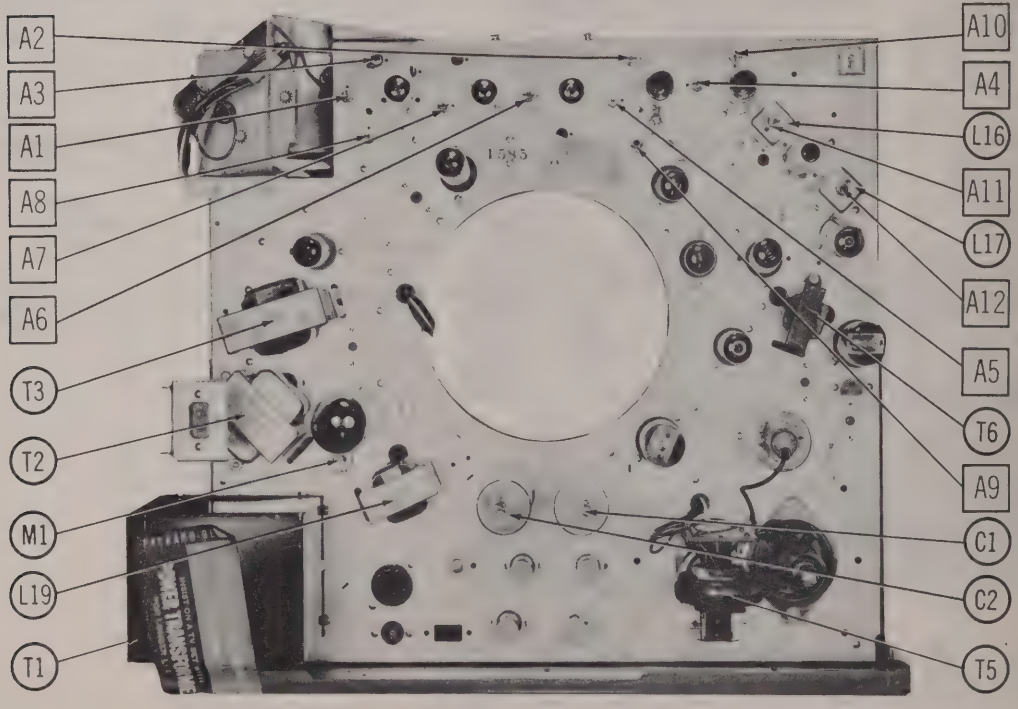
TUBES (GENERAL ELECTRIC, SYLVANIA)

ITEM No.	USE	TYPE	NOTES
V201	RF Amplifier	6BN4	

ITEM No.	USE	TYPE	NOTES
V202	Mixer-Osc.	6CG8	

CRYSTAL DIODES

ITEM No.	ORIG. TYPE	REPLACEMENT DATA			NOTES
		Packard-Bell PART No.	CBS PART No.	SYLVANIA PART No.	
M201	1N87		1N60	1N60	Fine tuning det. (Pigtail)

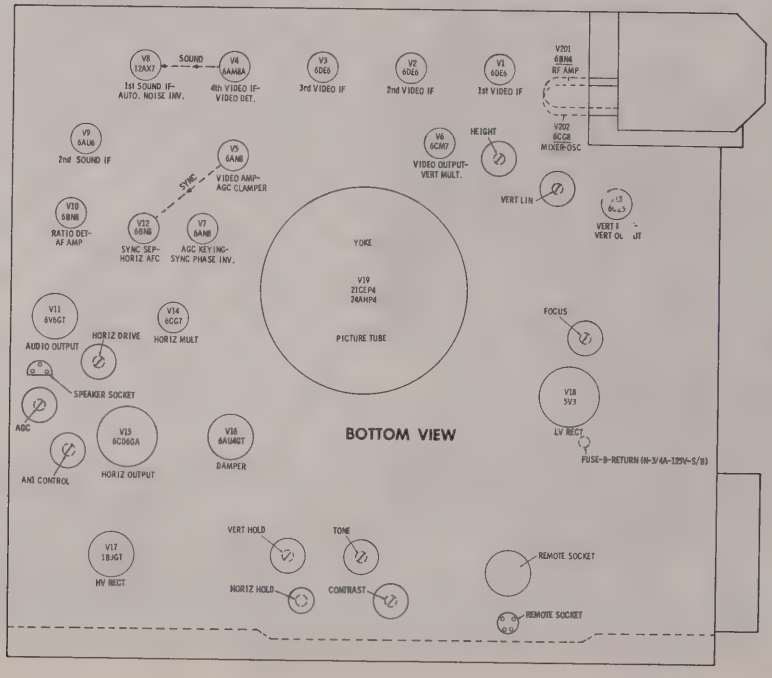


CHASSIS TOP VIEW

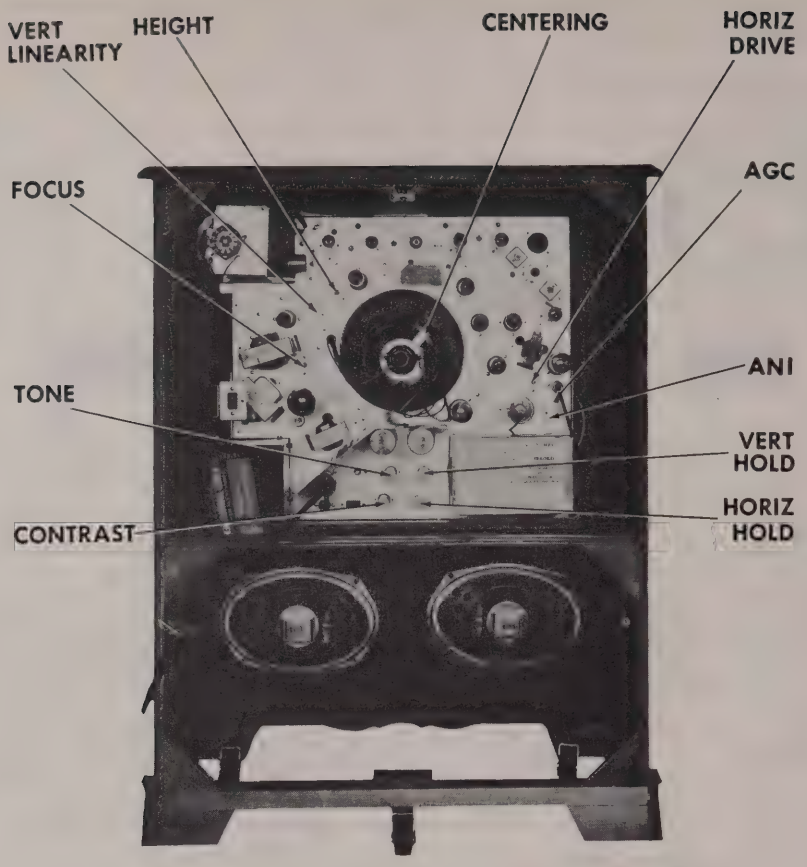
RESISTANCE MEASUREMENTS

ITEM	TUBE	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Pin 9
V1	6DE6	50K	68Ω	0Ω	.1Ω	†2000Ω	†2000Ω	0Ω		
V2	6DE6	40K	68Ω	0Ω	.1Ω	†1900Ω	†1900Ω	0Ω		
V3	6DE6	40K	68Ω	0Ω	.1Ω	†1800Ω	†1800Ω	0Ω		
V4	6AM8A	180Ω	.1Ω	†2800Ω	0Ω	.1Ω	†2800Ω	.1Ω	2800Ω	0Ω
V5	6AN8	550K	550K	0Ω	0Ω	.1Ω	†4500Ω	†1800Ω	2800Ω	68Ω
V6	6CM7	†3900Ω	NC	0Ω	0Ω	.1Ω	•†3.2meg	•1.7meg	220K	•700Ω
V7	6AN8	†8400Ω	†1meg	2700Ω	.1Ω	0Ω	320K	†38Ω	†50K	†1800Ω
V8	12AX7	†100K	•190K	2200Ω	.1Ω	.1Ω	†2800Ω	100K	68Ω	0Ω
V9	6AU6	100K	0Ω	0Ω	.1Ω	†5100Ω	†20K	120Ω		
V10	6BN8	INF	0Ω	INF	.1Ω	0Ω	24K	†440K	4.7meg	18Ω
V11	6V6GT	TP	.1Ω	†420Ω	†38Ω	470K	TP	0Ω	560Ω	
V12	6BN8	1.6meg	10Ω	1.6meg	.1Ω	0Ω	10Ω	†150K	2.2meg	0Ω
V13	6CZ5	†470Ω	NC	•2.8meg	0Ω	.1Ω	•2.8meg	0Ω	NC	†800Ω
V14	6CG7	†7800Ω	2meg	1500Ω	.1Ω	0Ω	†150K	100K	1500Ω	0Ω
V15	6CD6GA	TP	0Ω	0Ω	NC	770K	NC	.1Ω	†10K	TOP CAP ‡11.2Ω
V16	6AU4GT	TP	TP	¶	NC	†38Ω	NC	.1Ω	0Ω	
V17	1B3GT	PINS 1 THRU 8 HAVE INFINITE RESISTANCE								TOP CAP ‡331Ω
V18	5V3	NC	¶	NC	14Ω	NC	13Ω	NC	¶	
V19	21CEP4	0Ω	220K	‡1meg	•‡1.4meg	NC	NC	230K	.1Ω	
V201	6BN4	0Ω	1.8meg	0Ω	.1Ω	†3000Ω	0Ω	1.8meg		
V202	6CG8	10K	†18K	0Ω	0Ω	.1Ω	†3000Ω	†12K	0Ω	224K

¶ THIS READING CAN VARY GREATLY, (10K MINIMUM), DUE TO THE CONDITION OF THE ELECTROLYTIC CAPACITOR CONNECTED IN THE ASSOCIATED CIRCUIT.
• THIS READING WILL VARY. CONTROL SET FOR NORMAL OPERATION.
† MEASURED FROM 275V SOURCE.
‡ MEASURED FROM PIN 3 OF V16.
NC NO CONNECTION.
TP TIE POINT.



TUBE PLACEMENT CHART



CABINET—REAR VIEW

HORIZONTAL SWEEP CIRCUIT ADJUSTMENTS

1. Turn the set on and tune in a TV station, preferably with a test pattern.

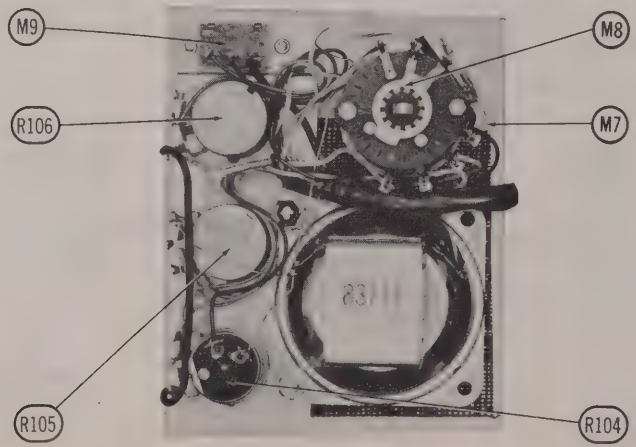
2. Set the brightness and contrast controls for a normal picture.

3. Turn the horizontal hold clockwise until the picture loses sync. It may be necessary to switch off channel and back again for picture to lose sync.

4. Turn the horizontal hold slowly counter clockwise until the picture just falls into sync.

5. Turn to an unused channel. If vertical lines appear near the center of the screen, slowly adjust the horizontal drive control (R7) until white lines disappear.

6. If in step 5 the horizontal drive was adjusted, tune in a TV station and repeat steps 3 and 4. Check horizontal sync by switching off channel and back again.



REMOTE CONTROL

PROPERTY OF
L. F. BLANKENSHIP
3924 MEADE ST.
DENVER, COLORADO

DISASSEMBLY INSTRUCTIONS

MODEL A2221Y (Ch. 17A20)

PROPERTY OF
L. F. BLANKENSHIP
3924 MEADE S.
DENVER, COLORADO

CHASSIS REMOVAL

1. Remove 4 push-on type knobs from the front.
2. Remove 6 metal screws from the rear cover. Remove the rear cover.
3. Remove 4 metal screws holding the tuner. Remove the tuner.
4. Remove 2 metal screws holding the control bracket.
5. Remove the speaker leads.
6. Remove 4 chassis bolts from the bottom.
7. Remove the chassis.

TRADE NAME	Zenith	MODELS	CHASSIS
		A2221J, Y, A2223E, H, R, Y, A2245E, R, A2250M, R, A2251E, R, A2282E, R, A2673E, R	17A20
		A2221JU, YU, A2223EU, HU, RU, YU, A2245EU, RU, A2250MU, RU, A2251EU, RU, A2282EU, RU, A2673EU, RU	17A20U
		A3001E, H, R, A3006E, H, R, A3008E, R	17A20Q
		A3000E, R, A3004, E, R	17A21Q

MANUFACTURER	Zenith Radio Corp., 6001 Dickens Avenue, Chicago 39, Illinois
TYPE SET	Television Receiver
TUBES	Seventeen
POWER SUPPLY	110-120 Volts AC, 60 Cycle RATING 185 Watts, 1.6 Amp. @ 117 Volts AC
TUNING RANGE	Channels 2 thru 13 VHF, 14 thru 83 UHF, Video IF 45.75MC, Sound IF 41.25MC (Intercarrier)

SERVICING IN THE FIELD

TUNER OSCILLATOR ADJUSTMENTS

Touch-up adjustment of the VHF oscillator is possible by removing the channel selector and fine tuning knobs. Set the fine tuning at the center of its range. The adjustments (located in a circle around the shaft) should be made in sequence from the highest to the lowest channel in the area. Channel 13 adjustment is located at 12 o'clock, proceed in a counter clockwise direction adjusting for best picture and sound.

PICTURE TUBE SAFETY GLASS CLEANING

Remove 4 push-on type knobs from the front. Remove 4 metal screws holding knob escutcheons. Tilt the safety glass out at the top and lift to remove.

SPECIAL ADJUSTMENTS

A. AGC
Observe the picture and advance the AGC control to a point where the picture distorts or a buzz is heard in the sound. Back off from this setting until the picture becomes stable with no noise in the sound.

B. Fringe Lock
Turn the fringe lock control fully clockwise, then counter clockwise approximately 1/4 turn. Adjust picture to lock in with hold controls. If picture jitters, tears, etc. adjust fringe lock counter clockwise until stable. Readjust hold controls and check operation on all channels in the area.

C. Focus
The focus may be varied by means of a focus control. (For location see tube placement chart).

D. Width
The width may be varied by menas of a metallic sleeve located between the yoke and the picture tube neck. Adjust sleeve in or out of the yoke for a picture SLIGHTLY larger than necessary to fill the screen.

HORIZONTAL OSCILLATOR FIELD ADJUSTMENTS

The horizontal oscillator coil is used as the horizontal hold control. Adjust the horizontal hold until the picture synchronizes horizontally. (For location, see tube placement chart).

SOUND IF DETECTOR BUZZ ADJUSTMENT

To eliminate audio detector buzz, adjust the buzz control for MINIMUM buzz and maximum sound. (For location, see tube placement chart).

FUSES

One fuse is used for horizontal sweep circuit protection. (For location, see tube placement chart).

CENTERING

Centering is accomplished mechanically by adjusting two magnetic rings around the neck of the picture tube. Rotate the two rings around the neck of the tube until the picture is properly centered.

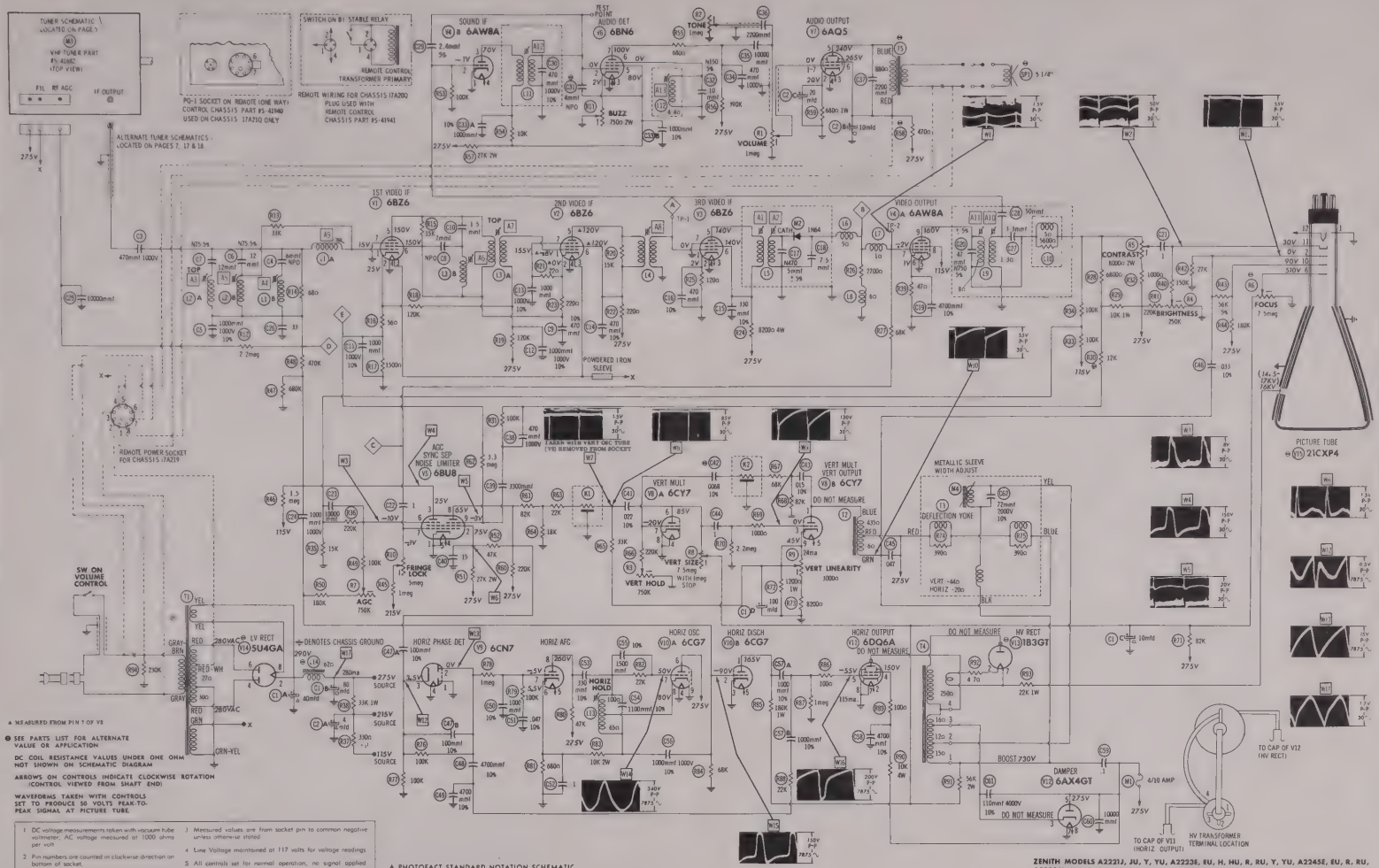
HOWARD W. SAMS & CO., INC. • Indianapolis 5, Indiana

The listing of any available replacement part herein does not constitute in any case a recommendation, warranty or guaranty by Howard W. Sams & Co., Inc., as to the quality and suitability of such replacement part. The numbers of these parts have been compiled from information furnished to Howard W. Sams & Co., Inc., by the manufacturers of the particular type of replacement part listed. Reproduction or use, without express permission, of editorial or pictorial content, in any manner, is prohibited. No patent liability is assumed with respect to the use of the information contained herein. © 1958 Howard W. Sams & Co., Inc., Indianapolis 5, Indiana. Printed in U.S. of America

H38U

ZENITH MODELS A2221J, JU, Y, YU, A2223E, EU, H, HU, R, RU, Y, YU, A2245E, EU, R, RU, A2250M, MU, R, RU, A2251E, EU, R, RU, A2282E, EU, R, RU, A2673E, EU, R, RU, A3000E, R, A3001E, H, R, A3004E, R, A3006E, H, R, A3008E, R (Ch. 17A20, Q, U, 17A21Q)

FOLDER 4

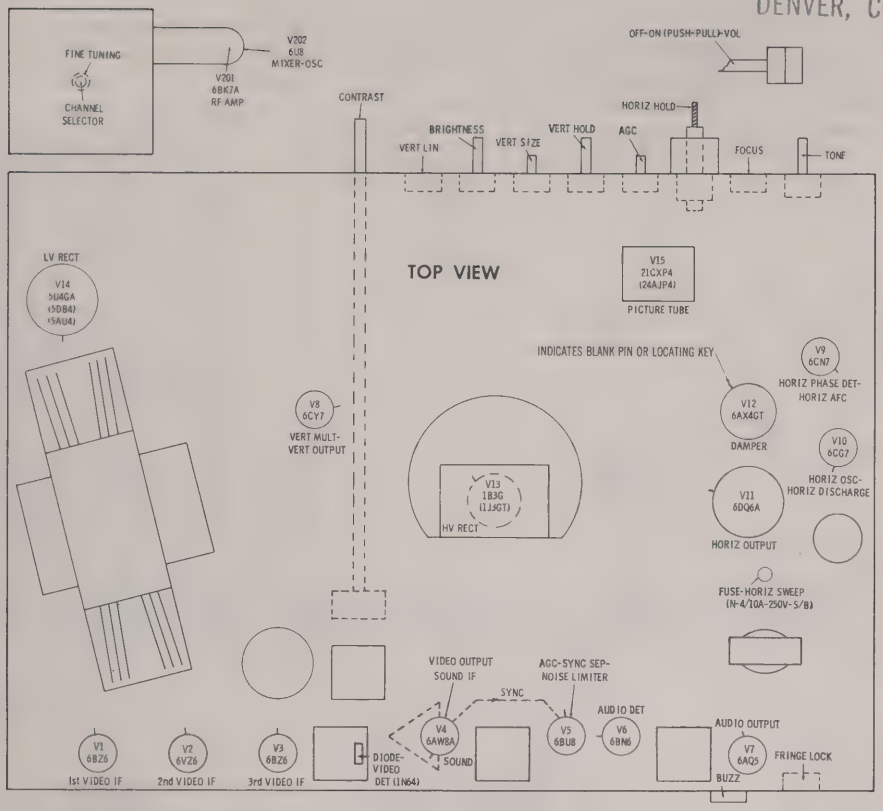

TUNER SCHEMATIC LOCATED ON PAGE 5
VHF TUNER PART #S-41662 (TOP VIEW)
SWITCH ON B1 STABLE RELAY
REMOTE CONTROL TRANSFORMER PRIMARY
PO-1 SOCKET ON REMOTE (ONE WAY) CONTROL CHASSIS PART #S-41940 USED ON CHASSIS 17A21Q ONLY
REMOTE WIRING FOR CHASSIS 17A20Q PLUG USED WITH REMOTE CONTROL CHASSIS PART #S-41941
ALTERNATE TUNER SCHEMATICS LOCATED ON PAGES 7, 17 & 18
SOUND IF V8 6AW8A
TEST POINT AUDIO DET V5 6BN6
AUDIO OUTPUT V7 6AQ5
1ST VIDEO IF V1 6BZ6
2ND VIDEO IF V2 6BZ6
3RD VIDEO IF V3 6BZ6
VIDEO OUTPUT V4 A 6AW8A
AGC SYNC SEP NOISE LIMITER V5 6BU8
VERT MULT V6 A 6CY7
VERT MULT VERT OUTPUT V6 B 6CY7
HORIZ PHASE DET V9 6CN7
HORIZ AFC
HORIZ OSC V10 A 6CG7
HORIZ DISCH V10 B 6CG7
HORIZ OUTPUT V11 6DQ6A
LV RECT V14 5U4GA
HV RECT V13 1B3GT
DAMPER V12 6AX4GT
PICTURE TUBE V11 21CXP4
REMOTE POWER SOCKET FOR CHASSIS 17A219
SW ON VOLUME CONTROL
FRINGE LOCK
AGC
VERT HOLD 750K
VERT SIZE 7.5meg
VERT LINEARITY
HORIZ HOLD
BUZZ 750n 2W
VOLUME 1meg
TONE 1meg
CONTRAST 8000n 2W
BRIGHTNESS 250K
FOCUS 7.5meg
DEFLECTION YOKE
METALLIC SLEEVE WIDTH ADJUST
POWDERED IRON SLEEVE
DO NOT MEASURE
BOOST 730V
TO CAP OF V12 (HV RECT)
TO CAP OF V11 (HORIZ OUTPUT)
HV TRANSFORMER TERMINAL LOCATION
4/10 AMP
275V SOURCE
215V SOURCE
115V SOURCE
280VAC
DENOTES CHASSIS GROUND
TAKEN WITH VERT OSC TUBE (V8) REMOVED FROM SOCKET
A MEASURED FROM PIN 7 OF V2
SEE PARTS LIST FOR ALTERNATE VALUE OR APPLICATION
DC COIL RESISTANCE VALUES UNDER ONE OHM NOT SHOWN ON SCHEMATIC DIAGRAM
ARROWS ON CONTROLS INDICATE CLOCKWISE ROTATION (CONTROL VIEWED FROM SHAFT END)
WAVEFORMS TAKEN WITH CONTROLS SET TO PRODUCE 50 VOLTS PEAK-TO-PEAK SIGNAL AT PICTURE TUBE.
1 DC voltage measurements taken with vacuum tube voltmeter. AC voltage measured at 1000 ohms per volt
2 Pin numbers are counted in clockwise direction on bottom of socket.
3 Measured values are from socket pin to common negative unless otherwise stated
4 Line Voltage maintained at 117 volts for voltage readings
5 All controls set for normal operation, no signal applied
A PHOTOFACT STANDARD NOTATION SCHEMATIC
Howard W Sams & Co. Inc. 1958

ZENITH MODELS A2221J, JU, Y, YU, A2223E, EU, H, HU, R, RU, Y, YU, A2245E, EU, R, RU, A2250M, MU, R, RU, A2251E, EU, R, RU, A2282E, EU, R, RU, A2673E, EU, R, RU, A3000E, R, A3001E, H, R, A3004E, R, A3006E, H, R, A3008E, R (Ch. 17A20, Q, U, 17A21Q)

FOLDER 4

TUBE PLACEMENT CHART

PROPERTY OF
L. F. BLANKENSHIP
3924 MEADE ST.
DENVER, COLORADO



TUBE FAILURE CHECK CHART

The following chart lists tubes whose failures are most likely to produce the indicated symptoms. Refer to tube placement chart for location and type of tube.

POWER SUPPLY FAILURE
No raster, no sound - **V14**

LOSS OF PICTURE OR SOUND
No pic, no sound, has raster - **V1, V2, V3, Diode (M2), V4**
No pic, no sound, has snow - **V201, V202, V1**
No pic, has sound, has raster - **V4, V15**
Has pic, no sound - **V4, V6, V7**
Overloaded picture - **V5**

SYNC FAILURE
No vert. sync - **V5**
No horiz. sync - **V5, V9**
No vert. or horiz. sync - **V5**

SWEEP FAILURE
No raster, has sound - **Fuse (M1), V9, V10, V11, V12, V13, V15**
No vertical deflection - **V8**
Poor vert. linearity or foldover - **V8**
Poor horiz. linearity or foldover - **V10, V11, V12**
Narrow picture - **V10, V11, V12, V14**
Vert. off freq. - **V8**
Horiz. off freq. - **V9, V10**

ALIGNMENT INSTRUCTIONS

PRE-ALIGNMENT INSTRUCTIONS

Allow a 20 minute warm-up period for the receiver and test equipment.

VIDEO IF ALIGNMENT

Connect the synchronized sweep voltage from the sweep generator to the horizontal input of the oscilloscope for horizontal deflection. The sweep generator output lead should be terminated with its characteristic impedance, usually 50 ohms.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
1.	470mmf	High side to point Ⓐ. Low side to chassis.	44MC (10MC Swp)	39.75MC 41.25MC 45.75MC	Between any two channels	Vert. Amp. thru 10K to point Ⓑ. Low side to chassis. (across video det. load).	A1, A2	Set sweep generator output to produce 3 volts peak to peak on scope. Adjust A1 and A2 alternately for maximum gain and symmetry with the 45.75MC positioned as shown in Fig. 1. The 39.75MC marker can fall within ± .5MC of the specified frequency. If the desired response cannot be obtained, check to see that the cores are entering their respective windings from opposite ends of the coils.
2.	Direct	High side to ungrounded tube shield floating over mixer-oscillator tube (V202). Low side to chassis.	"	39.75MC 41.25MC 47.25MC	"	"	A3, A4, A5, A6	Connect a clip lead from point Ⓒ to chassis. Connect a clip lead from point Ⓓ to point Ⓔ. Use high scope gain and adjust A3 thru A6 for MINIMUM marker amplitudes as in Fig. 2. A3 controls 39.75MC marker, A4 controls 41.25MC marker and A5 and A6 controls 47.25MC marker.
3.	"	"	"	41.25MC 42.75MC 45.0MC 45.75MC	"	"	A7, A8, A9 and Mixer Plate Coil	Disconnect clip lead from point Ⓔ and connect to chassis. Adjust for maximum gain and symmetry of response similar to Fig. 3 with markers as shown. A7 affects low side of curve and A8 affects high side.

SOUND IF ALIGNMENT

Connect an adjustable attenuator between the antenna and the receiver terminals. Tune in a modulated TV signal and adjust the attenuator until the signal is below the limiting level of the 6BN6 (V6) as evidenced by a hiss similar to super-regeneration in the sound. Adjust A10, A11, A12 and A13 for maximum sound and best quality. Adjust the buzz control (R11) for MINIMUM buzz. If the hiss disappears during sound alignment, further reduce the signal until the hiss returns.

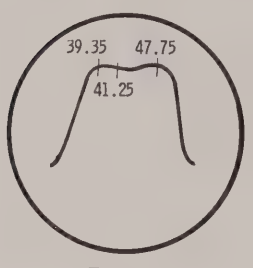


FIG.1

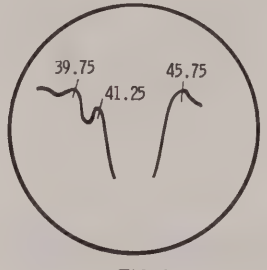


FIG.2

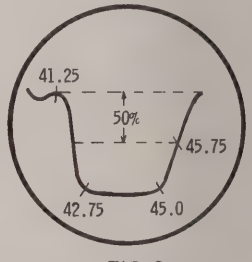
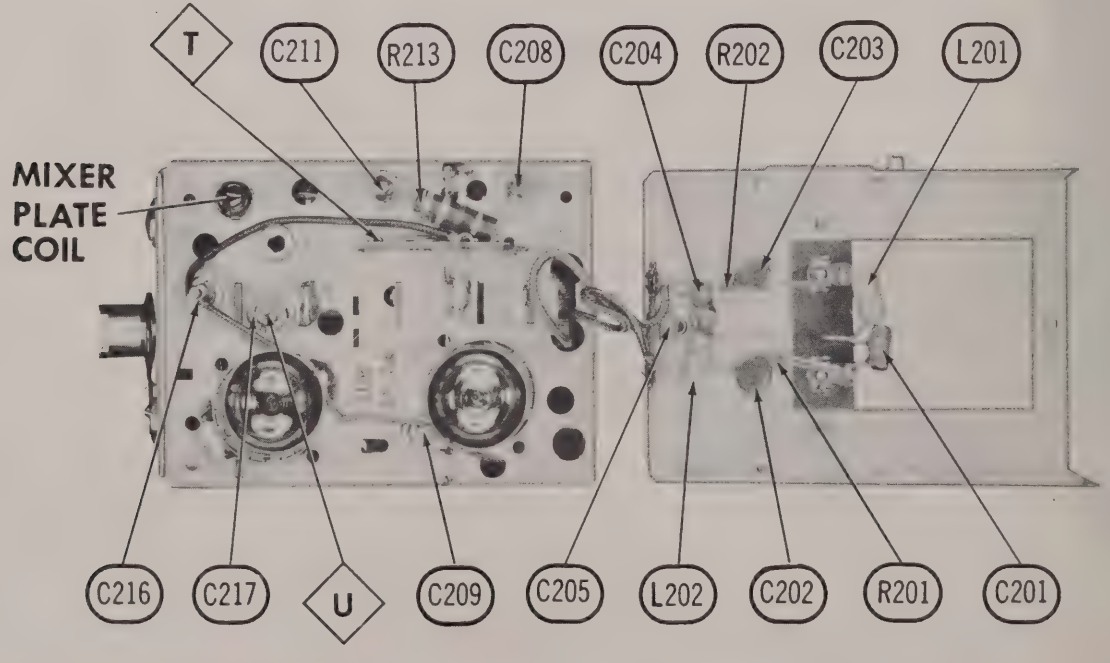
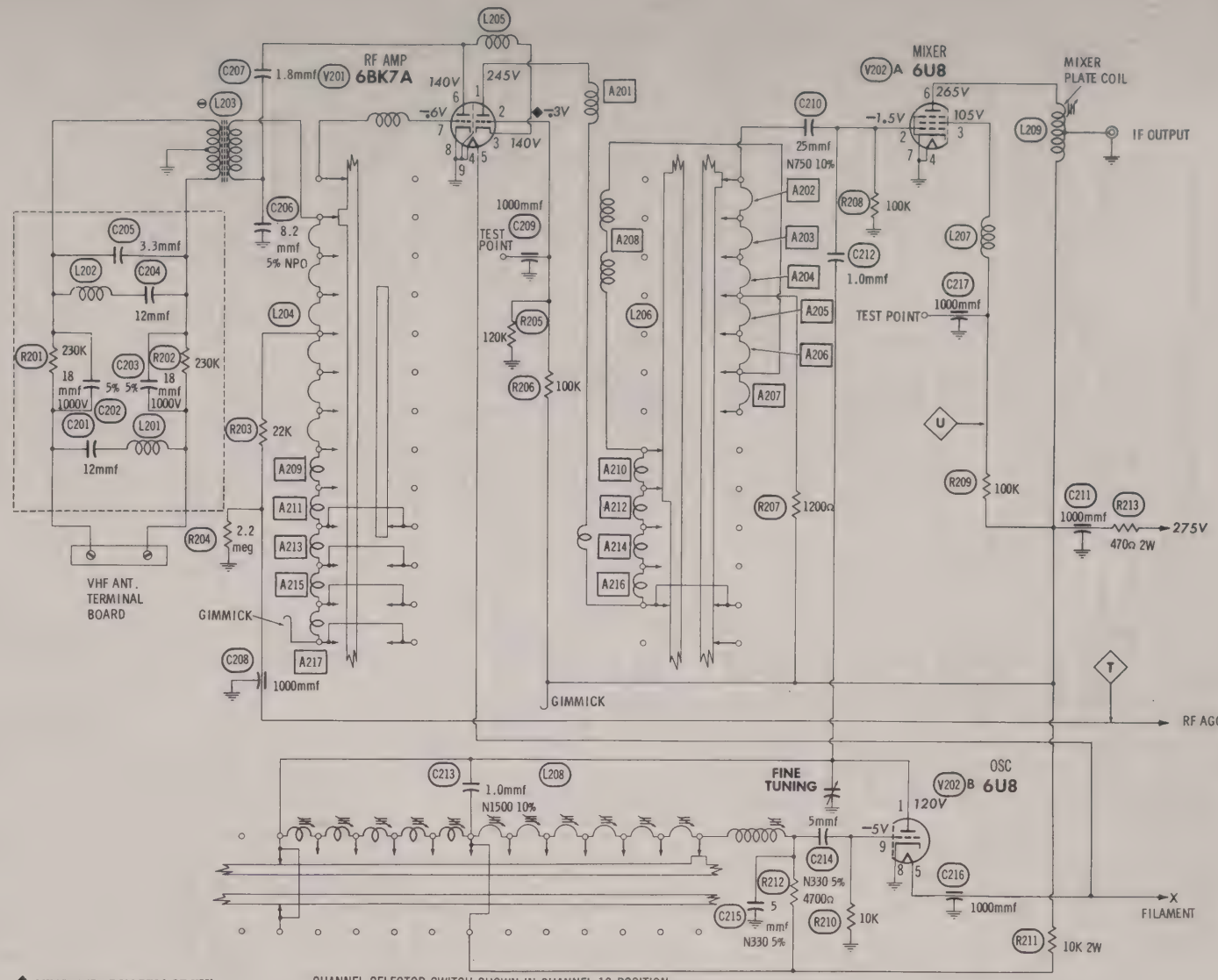


FIG.3



RF TUNER—TOP VIEW



◆ MEASURED FROM PIN 3 OF V201.

CHANNEL SELECTOR SWITCH SHOWN IN CHANNEL 13 POSITION

VHF TUNER PART #S-41682

A PHOTOFACT STANDARD NOTATION SCHEMATIC
Howard W. Sams & Co., Inc. 1958

TUNER SCHEMATIC

PROPERTY OF
L. F. BLANKENSHIP
3224 MEADE St.
DENVER, COLORADO

ZENITH MODELS A2221J, JU, Y, YU, A2223E, EU, H, HU, R, RU, Y, YU, A2245E, EU, R, RU, A2250M, MU, R, RU, A2251E, EU, R, RU, A2282E, EU, R, RU, A2673E, EU, R, RU, A3000E, R, A3001E, H, R, A3004E, R, A3006E, H, R, A3008E, R (Ch. 17A20, Q, U, 17A21Q)

TUNER ALIGNMENT INSTRUCTIONS

PRE-ALIGNMENT INSTRUCTIONS

USE AN ISOLATION TRANSFORMER TO PROTECT THE TEST EQUIPMENT.
Allow a 20 minute warm-up period for the receiver and test equipment.

VHF OSCILLATOR ALIGNMENT FOR TUNERS #S-41682 AND S-41683

Set the fine tuning to the center of its range by turning fine tuning shaft until the small index hole in the drive cam is directly over the small hole just below the channel 13 oscillator adjustment screw. Starting with the highest channel operating in the area, adjust the appropriate oscillator adjustment screw for best picture and sound for each channel available.

VHF RF AND MIXER ALIGNMENT FOR TUNERS #S-41682 AND S-41683

Connect the negative lead of a 2 volt bias supply to point (T). Positive to chassis.
Connect the synchronized sweep voltage from the sweep generator to the horizontal input of the oscilloscope for horizontal deflection.
The sweep generator output lead should be terminated with its characteristic impedance, usually 50 ohms.
Use only enough sweep generator output to provide a usable pattern on scope.
Use 10MC sweep unless otherwise noted.
Coils not containing adjustable cores are adjusted by expanding or compressing coil turns.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
1.	Matching Network	Across antenna terminals.	213MC	211.25MC 215.75MC	13	Vert. Amp. thru 10K to point (U). Low side to chassis.	A201	Adjust for maximum gain and symmetry of response similar to Fig. 201 with markers as shown.
2.	"	"	207MC	205.25MC 209.75MC	12	"	A202	"
3.	"	"	201MC	199.25MC 203.75MC	11	"	A203	"
4.	"	"	195MC	193.25MC 197.75MC	10	"	A204	"
5.	"	"	189MC	187.25MC 191.75MC	9	"	A205	"
6.	"	"	183MC	181.25MC 185.75MC	8	"	A206	"
7.	"	"	177MC	175.25MC 179.75MC	7	"	A207	"
8.	"	"	85MC	83.25MC 87.75MC	6	"	A208, A209	Adjust for maximum gain and symmetry of response similar to Fig. 201 with markers as shown. Adjust first coil for proper marker position and second coil for maximum gain and symmetry.
9.	"	"	79MC	77.25MC 81.75MC	5	"	A210, A211	"
10.	"	"	69MC	67.25MC 71.75MC	4	"	A212, A213	"
11	"	"	63MC	61.25MC 65.75MC	3	"	A214, A215	"
12.	"	"	57MC	55.25MC 59.75MC	2	"	A216, A217	"

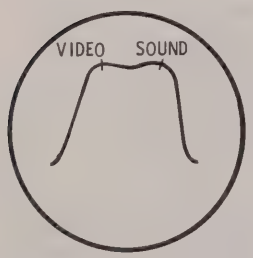


FIG. 201

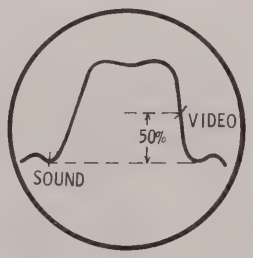
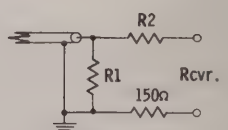


FIG. 202



Zo = Impedance of Cable

Zo	R1	R2
50Ω	50Ω	120Ω
75Ω	82Ω	110Ω
92Ω	110Ω	110Ω

FIG. 203

ALTERNATE UHF-VHF TUNER SCHEMATIC
ZENITH MODELS A2221J, JU, Y, YU, A2223E, EU, H, HU, R, RU, Y, YU, A2245E, EU, R, RU, A2250M, MU, R, RU, A2251E, EU, R, RU, A2282E, EU, R, RU, A2673E, EU, R, RU, A3000E, R, A3001E, H, R, A3004E, R, A3006E, H, R, A3008E, R (Ch. 17A20, Q, U, 17A21Q)
FOLDER 4
MIXER PLATE COIL
IF OUTPUT
MIXER A 6U8
RF AMP 6BK7A
OSC B 6U8
FINE TUNING
FILAMENT
RF AGC
275V
TEST POINT
CHANNEL SELECTOR SWITCH SHOWN IN CHANNEL 13 POSITION
VHF TUNER PART #S-41683
UHF OSC 6AF4A
VHF ANT.
UHF ANT.
CRYSTAL MIXER
CATH
CHANNEL BRACKET
UHF TUNER PART #S-41945
A PHOTOFACT STANDARD NOTATION SCHEMATIC
Howard W. Sams & Co., Inc. 1958

PROPERTY OF
L. F. BLANKENSHIP
3924 MEADE ST.
DENVER, COLORADO

ALTERNATE TUNER ALIGNMENT INSTRUCTIONS

PRE-ALIGNMENT INSTRUCTIONS

USE AN ISOLATION TRANSFORMER TO PROTECT THE TEST EQUIPMENT.
Allow a 20 minute warm-up period for the receiver and test equipment.

VHF OSCILLATOR ALIGNMENT FOR TUNERS #S-41692 AND S-41693

Set the fine tuning at the center of its range. The adjustments are accessible, one at a time, as the channel selector is rotated.
Adjust for best picture and sound.

VHF RF AND MIXER ALIGNMENT FOR TUNERS #S-41692 AND S-41693

Connect negative lead of 0-15 volt variable bias supply to point (T) . Positive to chassis. Adjust bias for 2.5 volts at point (T) .
Connect the synchronized sweep voltage from the sweep generator to the horizontal input of the oscilloscope for horizontal deflection.
Use only enough sweep generator output to provide a usable pattern on scope.
Use 10MC sweep unless otherwise noted.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
1.	Fig. 203	Across antenna terminals matching network (Fig. 203).	195MC	193.25MC 197.75MC	10	Vert. Amp. thru 10K to point (T) . Low side to chassis.	A201, A202, A203	Adjust A201 and A202 for maximum amplitude and symmetry with markers as shown in Fig. 201. Increase bias for MINIMUM amplitude of response curve. Without changing the bias adjust A203 to obtain MINIMUM response on the scope.
2.	"	"	213MC	211.25MC 215.75MC	13	"	A204	Adjust for maximum amplitude of response similar to Fig. 201. Adjust by expanding or compressing coil turns.
			207MC	205.25MC 209.75MC	12		A205	
			201MC	199.25MC 203.75MC	11		A206	
			195MC	193.25MC 197.75MC	10		A207	
			189MC	187.25MC 191.75MC	9		A208	
			183MC	181.25MC 185.75MC	8		A209	
			177MC	175.25MC 179.75MC	7		A210	
			85MC	83.25MC 87.75MC	6		A211	
			79MC	77.25MC 81.75MC	5		A212	
			69MC	67.25MC 71.75MC	4		A213	
			63MC	61.25MC 65.75MC	3		A214	
			57MC	55.25MC 59.75MC	2		A215	

UHF ALIGNMENT

Alignment of the UHF tuner should not be attempted unless proper test equipment is available. Switch the receiver to the UHF position.
Connect 2 volts bias to the IF AGC line and adjust the sweep generator output to provide 3 volts peak to peak on the scope in the following steps.
Connect the synchronized sweep voltage from the sweep generator to the horizontal input of the oscilloscope for horizontal deflection.
Use 10MC sweep unless otherwise noted.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
3.	Fig. 203	Across UHF antenna terminals thru matching network (Fig. 203).	713MC	711.25MC	54	Vert. Amp. thru 10K across video detector load.	A216, A217, A218	Tuner rocker arm should be in a horizontal position. If necessary, loosen the set screw and adjust the tuner so that rocker arm is horizontal when the channel selector is set at channel 54. Do not adjust A216 unless oscillator calibration is off more than 3 channels. If necessary, adjust A216 to place video marker at 50% on response curve as in Fig. 202. The image (weaker response) will appear also. The response toward the counter clockwise position of A216 is the proper response. Adjust A217 and A218 for maximum amplitude of response similar to Fig. 202.
4.	"	"	473MC	471.25MC	14	"		Check for response similar to Fig. 202. If the oscillator is off more than 3 channels, adjust the oscillator travel (oscillator, mixer and antenna travel adjustments are the 3 round screws on top of the UHF tuner) adjustment to scale. Care must be used in making this adjustment so as not to move the rocker arm out of its bearing. Set the mixer and antenna travel adjustments for maximum response on scope.
5.	"	"	887MC	885.25MC	83	"	A219, A220, A221	Adjust A219 to place marker at 50% as in Fig. 202. Adjust A220 and A221 for maximum gain and symmetry similar to Fig. 202.

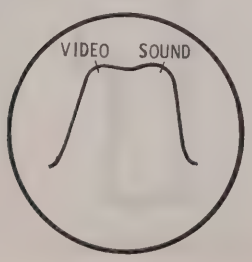


FIG. 201

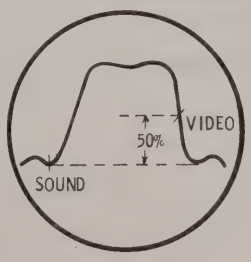
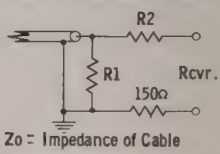


FIG. 202



Zo = Impedance of Cable

Zo	R1	R2
50Ω	50Ω	120Ω
75Ω	82Ω	110Ω
92Ω	110Ω	110Ω

FIG. 203

PROPERTY OF
L. F. BLANKENSHIP
3924 MEADE St.
DENVER, COLORADO

CHASSIS BOTTOM VIEW-CAPACITOR AND ALIGNMENT IDENTIFICATION

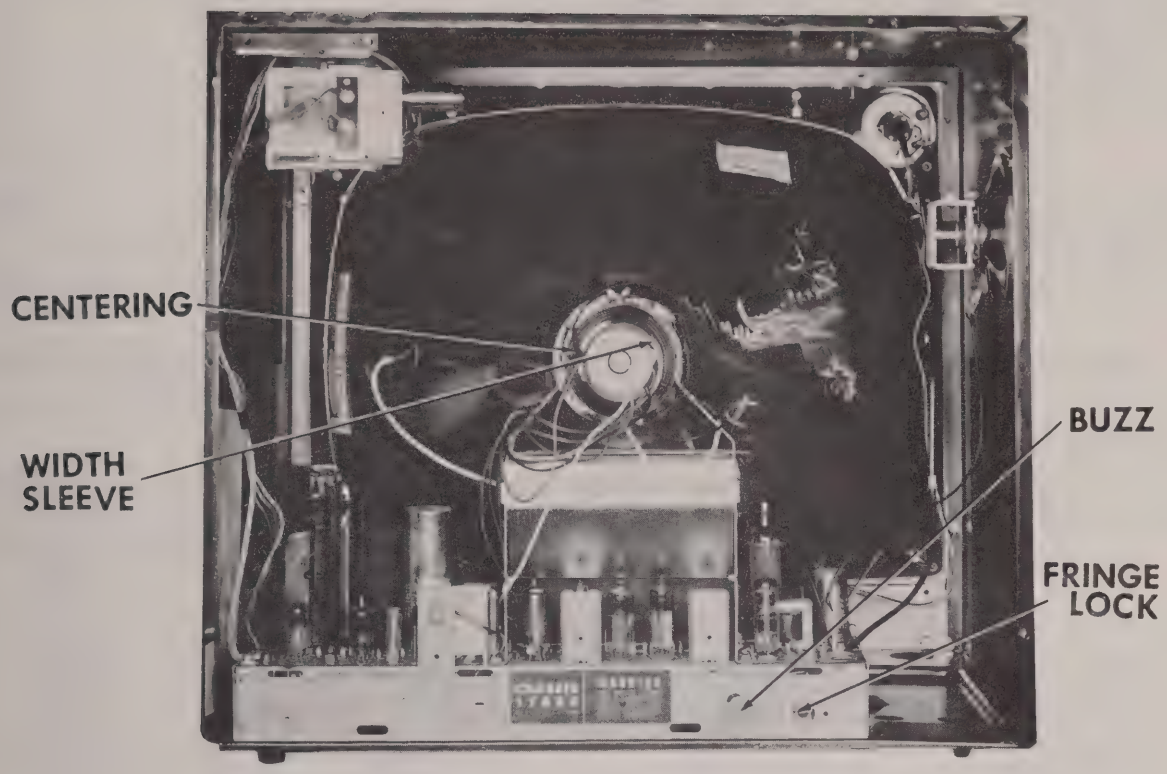
ZENITH MODELS A22311, JU, Y, YU, A22325E, EU, H, HU, R, RU, Y, YU, A22435E, EU, R, RU, A22530W, WU, R, RU, A22531E, EU, R, RU, A22832E, EU, R, RU, A26736, EU, R, RU, A30003E, R, A30011E, N, R, A30045E, N, R, A30098E, N (CH. 17A210 Q, 17A21Q)

FOLDER 4

CHASSIS BOTTOM VIEW-RESISTOR AND INDUCTOR IDENTIFICATION

ZENITH MODELS A22212J, JU, Y, YU, A22236E, EU, H, HU, R, RU, Y, YU, A22436E, EU, R, RU, A22504, MU, R, RU, A22516E, EU, R, RU, A22626E, EU, R, RU, A26736E, EU, R, RU, A30006E, R, A30016E, H, R, A30046E, R, A30066E, H, R, A30086E, R (CH. 17A22Q, Q, U, 17A21Q).

PROPERTY OF
L. F. BLANKENSHIP
3924 MEADE ST.
DENVER, COLORADO



CABINET—REAR VIEW

HORIZONTAL SWEEP CIRCUIT ADJUSTMENTS

Turn the set on and tune in a TV station, preferably with a test pattern.

Set the brightness and contrast controls for a normal picture.

Turn the horizontal hold clockwise until the picture loses sync. It may be necessary to switch off channel and back again for picture to lose sync.

Turn the horizontal hold slowly counter clockwise until the picture just falls into sync.

PARTS LIST AND DESCRIPTIONS

TUBES (GENERAL ELECTRIC, SYLVANIA)

ITEM No	USE	TYPE	NOTES
V1	1st Video IF Amp	6BZ6	
V2	2nd Video IF Amp	6BZ6	
V3	3rd Video IF Amp	6BZ6	
V4	Video Output-Sound IF Amp	6AW8A	
V5	AGC - Sync Sep. - Noise Limiter	6BU8	
V6	Audio Det	6BN8	
V7	Audio Output	6AQ5	

* Alternate

ITEM No	USE	TYPE	NOTES
V8	Vert. Mult - Vert Output	6CY7	
V9	Horiz Phase Det - Horiz AFC	6CN7	
V10	Horiz Osc.-Horiz Discb.	6CG7	
V11	Horiz Output	6BQ6A	
V12	Damper	6AX4GT	
V13	HV Rectifier	1B3GT	1J3GT *
V14	LV Rectifier	5U4GA	5DB4 * 5AU4 *

+ Used in Ch. 17A2LQ

PICTURE TUBE

ITEM No	REPLACEMENT DATA				NOTES
	ZENITH PART No	GENERAL ELECTRIC PART No	RCA PART No	SYLVANIA PART No	
V15	21CXP4 34AJP4			21CXP4 ①	① "Silver Screen 85"

ELECTROLYTIC CAPACITORS

ITEM No	RATING		REPLACEMENT DATA					
	CAP	VOLT	ZENITH PART No	AEROVOX PART No	CORNELL-DUBILIER PART No	MALLORY PART No	PYRAMID PART No	SANGAMO PART No	SPRAGUE PART No
C1A	a40	400	23-2971	AFH4-113-50	C1445 ③	FP459		Q-048	*1R2S94
B	a80	400			BR8045	TC80		MTD-4520	
C	a10	475							
D	100	50							
C2A	44	350	23-2744	AFH3-180	C1445	FP394		T-410	TVL-3806.8
B	a40	400				TC32			
C	30	25							

FIXED CAPACITORS

Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING		REPLACEMENT DATA							NOTES
	CAP.	VOLT	ZENITH PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ERIE PART No.	MALLORY PART No.	SPRAGUE PART No.	
C3	470	1000	23-6	HVD-15-470	DD-471	BYA10T47	ED15-470	DC30347	5GA-T47	NPO
C4	8		23-2382			C10V8C				10%
C5	1000	1000	23-17							20%
C6	15		23-2375							NTO 5%
C7	12		23-2378							NTO 5%
C8	7		23-2513			C10Y7C				NPO
C9	470		23-16		D6-471	SR5T47	ED-470		MS-347	10%
C10	1.5		23-1764	NPO-4I 1.5	TCZ-1R5	C10V15C	TCO-1.5		5TCCB-V15	
C11	1000	1000	23-17							10%
C12	1000	1000	23-17							10%
C13	1000	1000	23-17							10%
C14	470		23-16		D6-471	SR5T47	ED-470		MS-347	10%
C15	330		23-2867	1469-00033	D6-331	SR5T33	ED-330		MS-333	10%
C16	470		23-16		D6-471	SR5T47	ED-470		MS-347	10%
C17	8		23-2360							
C18	7.5		23-2742							
C19	4700		23-14			1R5D47			MS-347	10%
C20	47		23-2467		TCN-47		TCT-47		NT50 5%	
C21	.1	200	23-1777	P288N-1	DF-104	CUB2P1		GEM-301	2TM-P1	20%
C22	.1	200	23-1777	P288N-1	DF-104	CUB2P1		GEM-301	2TM-P1	20%
C23	10000		23-3	BPD-01	DD-103	BYA8S1	ED-01	DC511	5SK-S1	
C24	1000	1000	23-17	HVD-15-1000	DD-103	BYA10DX	ED15-1000	DC3D2	5GA-D2	
C25	10000		23-3	BPD-01	DD-103	BYA8S1	ED-01	DC511	5SK-S1	
C26	.33	300	23-2159	P288N-33		CUB2P33		GEM-3033	2TM-P33	
C27	3.3		23-2542	NPO-4I 3.3	TCZ-3R3	C10V33C	TCO-3.3	ET-5333	5TCCB-V33	
C28	50		23-2460	5I 50	D6-500	LT2Q5	GP-50	UC-548	5GA-Q5	
C29	5.6		23-2696							5%
C30	470	1000	23-2680							10%
C31	4					C10V4C				NPO ①
C32	10		23-2731							NI50 5%
C33A	1000		23-21		1R5D1		ED-1000	MC3D55	5GA-D1	10%
B	1000				1R5D2		ED-1000	MC3D55	5GA-D1	10%
C34	470	1000	23-6	HVD-15-470	DD-471	BYA10T47	ED15-470	DC30347	5GA-T47	
C35	10000		23-3	BPD-01	DD-103	BYA8S1	ED-01	DC511	5SK-S1	
C36	2200		23-8	BPD-0022	DD-222	BYA10D22	ED-0022	UC-5222	5GA-D22	
C37	2200		23-8	BPD-0022	DD-222	BYA10D22	ED-0022	UC-5222	5GA-D22	
C38	470	1000	23-6	HVD-15-470	DD-471	BYA10T47	ED15-470	DC30347	5GA-T47	
C39	2200		23-11	BPD-0022	DD-222	BYA10D22	ED-0022	UC-5222	5GA-D22	
C40	.15	200	23-2147	P288N-15		CUB2P15		GEM-3015	2TM-P15	
C41	.022	200	23-2832			1R5E2	ED-1000	MC3B55	5GA-D1	10%
C43	0068	600						GEM-10366		10% ②
C43	.018	600	23-2264							10%
C44	.1	400	23-3061	P488N-1	DF-104	CUB4P1		GEM-401	4TM-P1	
C45	.047	200	23-1778	P288N-047	DF-503	CUB2S47		GEM-447	2TM-S47	
C46	.033	400	23-2535							10%
C47A	100		23-23	BPD-0001	DD-101	L10T1	ED-100	UC-531	5GA-T1	
B	100			BPD-0001	DD-101	L10T1	ED-100	UC-531	5GA-T1	
C48	4700		23-14			1R5D47			MS-347	10%
C49	4700		23-14			1R5D47			MS-347	10%
C50	1000		23-17			1R5D1	ED-1000	MC3B55	MS-21	10%
C51	.047	300	23-1778	P288N-1	DF-104	CUB2P1		GEM-301	2TM-P1	
C52	.1	300	23-1777	P288N-1	DF-104	CUB2P1		GEM-301	2TM-P1	20%
C53	330		23-2867	1469-00033	D6-331	SR5T33	ED-330		MS-333	10%
C54	1000		23-2859	1464-0011		1R5D1	CY30C1S2		MS-21	10%
C55	1500		23-13			1R5D15	ED-1500		MS-215	10%
C56	1000	1000	23-17							10%
C57A	1000		23-21			1R5D1	ED-1000	MC3B55	MS-21	10%
B	1000					1R5D2	ED-1000	MC3B55	MS-21	10%
C58	4700		23-14			1R5D47			MS-347	10%
C59	1	600	23-1941	P688N-1	DF-104	CUB6P1		GEM-601	6TM-P1	
C60	1000		23-3	BPD-01	DD-103	BYA8S1	ED-01	DC511	5SK-S1	
C61	110	4000	22-2694							10%
C62	72	2000								10%

① Some versions use 7.5mmf (Part #23-2742) in this application.
② Some versions use .01mfd @ 200V 10% (Part #22-2565) in this application.

CONTROLS

ITEM No	RATING		REPLACEMENT DATA						INSTALLATION NOTES
	RESISTANCE	WATTS	ZENITH PART No	CENTRALAB PART No	CLAROSTAT PART No	IRC PART No	MALLORY PART No		
R1A	1meg		63-4006	B-70	A47-1meg-Z	Q3-127	PP18A		Volume
B	Shaft			Not Req.	FS-2	Not Req.	Not Req.		
C	Switch			KB-1 *	SWK-12	78-1	Not Req.		
R2A	1meg		63-3816	B-70	A47-1meg-Z	Q3-127	U53		Tone
B	Shaft			Not Req.	KBS-3	Not Req.	Not Req.		
R3A	750K		63-3399	B-66	A47-750K-S	Q1-136	U54		Vert. Hold
B	Shaft			Not Req.	KBS-3	Not Req.	Not Req.		
R4A	250K		63-3572	B-50	A47-250K-S	Q1-130	U48		Brightness
B	Shaft			Not Req.	KBS-3	Not Req.	Not Req.		
R5A	5000	2(WW)	63-4001	WW-753 ††	A43-7500				Contrast
B	Shaft			Not Req.	DF8-1/2				
R6A	7.5meg		63-2569	AB-89	A47-7 5meg -S	Q1-143	U52		Focus-Note 1
B	Shaft								
	Shaft		63-2362	AK-1	FKS-1/4	RQ	Not Req.		AGC
R7A	750K		63-3566	AB-86	A47-750K-S	Q1-136	PTA754L		
B	Shaft			AK-1	FKS-1/4	TQ	Not Req.		
R8A	7 5meg		63-3363	AB-89 ††	A47-7 5meg -S	Q1-143 ††	PTA855R ††		Vert. Size with 1meg stop
B	Shaft			AK-1	FKS-1/4 ††	TQ	Not Req.		
R9A	3000Ω		63-3588	AB-83	A47-3000-S	Q1-112	PTA252L		Vert. Lin.
B	Shaft			AK-1	FKS-1/4	RQ	Not Req.		
R10A	5meg		63-4012			Q1-141			Fringe Lock
B	Shaft					TM1-K1			
R11	750Ω	2(WW)	63-3284		39-800		FL-750		Buss

Note 1. Alternate 5meg control (part #63-4026) may be used in some versions.
* Use KB-1 on red label control.
† File double flat as required
†† Use 1meg resistor in series with right hand terminal of control.

RESISTORS

All wattages 1/2 watt, or less, unless otherwise listed.

ITEM No.	RATING		ZENITH PART No	NOTES
	OHMS	WATT		
R13	2.2meg		63-1926	
R13	33K		63-4008	
R14	68Ω		63-1737	
R15	68Ω			
R16	56Ω		63-1733	
R17	1500Ω		63-1793	
R18	130K		63-1873	
R19	130K		63-1873	
R20	15K		63-2373	
R21	22Ω		63-1715	
R22	220Ω		63-1753	
R23	220Ω		63-1758	
R24	8200Ω	4	63-3802	
R25	47K		63-1747	
R26	2700Ω		63-1803	
R27	68K		63-1863	
R28	4700Ω		63-1793	
R29	10K	1	63-1071	
R30	12K		63-4821	
R31	100K		63-1870	
R32	1000Ω		63-1786	
R33	100K		63-1869	
R34	100K		63-1869	
R35	18K		63-1824	
R36	220K		63-1883	
R37	330Ω		63-1765	
R38	33K	1	63-967	
R39	47Ω		63-1729	
R40	150K		63-1878	
R41	220K		63-1884	
R42	27K		63-1845	
R43	56K 5%		63-1858	
R44	180K		63-1880	
R45	1meg		63-1911	
R46	1.5meg		63-1915	
R47	680K		63-1904	
R48	470K		63-1898	
R49	100K		63-1869	
R50	180K		63-1880	
R51	27K	3	63-947	
R52	47K		63-1855	
R53	100K		63-1870	

ITEM No.	RATING		ZENITH PART No	NOTES
	OHMS	WATT		
R54	10K		63-1827	
R55	680Ω		63-1779	
R56	390K		63-1894	
R57	27K	2	63-947	
R58	470Ω		63-1771	Note 1
R59	680Ω	1	63-3290	
R60	220K		63-1883	
R61	82K		63-1866	
R62	3.3meg		63-1853	
R63	22K		63-1843	
R64	10K		63-1828	
R65	33K		63-1848	
R66	220K		63-1883	
R67	68K		63-1863	
R68	82K		63-1866	
R69	1000Ω		63-1795	
R70	2.2meg		63-1926	
R71	82K		63-1866	
R72	1200Ω	1	63-1976	
R73	8200Ω		63-3602	
R74	390Ω		63-1763	
R75	390Ω		63-1788	
R76	100K		63-1869	
R77	100K		63-1869	
R78	1meg		63-1911	
R79	100K		63-1859	
R80	47K		63-1855	
R81	680Ω		63-1779	
R82	33K		63-1843	
R83	10K	3	63-2145	
R84	68K		63-1852	
R85	100K	1	63-2313	
R86	100Ω		63-1744	
R87	1meg		63-1912	
R88	22K		63-1841	
R89	100Ω		63-1764	
R90	10K	4	63-3523	
R91	56K	2	63-2341	
R92	5.7Ω		63-1561	
R93	22K	1	63-1055	
R94	330K		63-3607	

Note 1. Chassis 17A2LQ uses 330Ω 2W (Part #6J-1622) in this application.

TRANSFORMER (POWER)

ITEM No	RATING		REPLACEMENT DATA						
	PRI	SEC 1 SEC 2	ZENITH PART No.	Halldorson PART No	Merit PART No.	Ram PART No	Stancor PART No.	Thordarson PART No	Triad PART No
T1	117v 50/60	360VCT @ 280A	95-1555 ① 95-1562 ②						

① Used in Ch. 17A3P, U, Q.
② Used in Ch. 17A2LQ.

TRANSFORMERS (SWEEP CIRCUITS)

ITEM No	USE	REPLACEMENT DATA							NOTES
		ZENITH PART No	Halldorson PART No	Merit PART No	Ram PART No	Stancor PART No	Thordarson PART No	Triad PART No	
T2	Vert. Output	95-1552				A-8123 ①			
T3A	Yoke-Horiz. (33MH)	95-1554 ②	DF606 ③④	MDF-91 ③④	Y90F12/47 ③⑤	DY-13A ③⑥	Y-39 ⑤	Y-42-2.6 NW24	
B	(90°) Vert. (37.5MH)								
M5	Rear Cover & Centering Device	8-33237							
T4	Horiz. Output	5-41905		HVO-143	2G37 ① *	HO-37 ⑥ *	FLY-18 ⑥*		

① Connect as autoformer.
② Includes rear cover and centering device.
③ Connect yoke terminal #3 to horizontal output transformer terminal #2, yoke terminal #1 to horizontal output transformer terminal #1. Use original yoke damping network, if necessary, connect horizontal network across yoke terminals #3 and #7.
④ Use original rear cover and centering device.
⑤ Connect yoke terminal #3 to horizontal output transformer terminal #2, yoke terminal #7 to horizontal output transformer terminal #1. Cut and tape orange lead.
⑥ Use original mounting bracket.

*HORIZONTAL OUTPUT TRANSFORMER CONNECTION DATA

Use Original Width Coil Unless Replacement Type Is Listed

ORIGINAL TERMINAL CONNECTIONS	Halldorson Replacement Connections	Merit Replacement Connections	Ram Replacement Connections	Stancor Replacement Connections	Thordarson Replacement Connections	Triad Replacement Connections
4			4	4	4	
3			3	3	3	
2			2	2	2	
1			1	1	1	

TRANSFORMER (AUDIO OUTPUT)

ITEM No	IMPEDANCE		REPLACEMENT DATA						NOTES
	PRI.	SEC.	ZENITH PART No.	Halldorson PART No	Merit PART No	Ram PART No	Stancor PART No	Thordarson PART No	Triad PART No	
T5	9400Ω	3-4Ω	95-1379 ①	21117	A-2932	AU-808	A-3879	24852	S-17X	① Alternate part #95-1569

SPEAKER

ITEM No.	TYPE				REPLACEMENT DATA		NOTES
	SIZE	FIELD	V C	IMP	ZENITH PART No.	GUAM PART No	
SP1	5 1/4"	PM	3-4H		49-751 ①	52AJ	① Used in Models A2222J, JU, Y, YU, A3000S, R, A3001S, H, R, A3004S, R, A3006S, H, R, A3008S, R (Ch. 17A3Q, Q, U, 17A3IQ)
	10"	PM	3-4H		49-752 ②	10AJ1	② Used in Models A3008S, R
	10"	PM	3-4Ω		49-764 ③	10AS	③ Used in Models A2232E, EU, R, RU
	8"	PM	3-4Ω		49-760 ④	8AJ	④ Used in Models A2232E, EU, H, HU, R, RU, Y, YU, A2365E, EU, R, RU, A2365JE, EU, R, RU, A3004, E, R
					49-818 ⑤		⑤ Used in Models A2311E, EU, R, RU
					49-837 ⑥		⑥ Used in Models A2232E, EU, H, HU, R, RU, A3004, E, R
					49-834 ⑦		⑦ Used in Models A2311E, EU, R, RU
					49-835 ⑧		⑧ Two used in Models A3673E, EU, R, RU
	3 1/4"	Electrostatic			8-33239 ⑨		⑨ Used in Models A3008E, R, R
							⑩ Two used in Models A2250M, MU, R, RU
							⑪ Two used in Models A2365E, EU, R, RU

COILS (RF-IF)

ITEM No.	USE	REPLACEMENT DATA					NOTES
		ZENITH PART No.	Meissner PART No.	Merit PART No.	Miller PART No.	Ram PART No.	
L1A	1st. Video IF	8-41687					
B	41.25MC Trap						
L2A	47.25MC Trap	8-41683					
B	39.75MC Trap						
L3A	2nd. Video IF	8-41689					Note 1
B	47.25MC Trap						
L4	3rd. Video IF	8-41691					
L5	4th. Video IF	8-41697					
L6	Series Peaking Coil	8-41679	19-3075	TV-166	6173		① Microbeurtes
L7	RF Choke	8-21988	19-1004	BC-555	4610		② 7 Microbeurtes
L8	Shunt Peaking Coil	8-21690	19-3160	TV-160	6130		③ 13 Microbeurtes
L8A	4.5MC Trap	8-43043		TV-130			
B	1st. Sound IF						
L10	Series Peaking Coil	8-21563	19-3135 *	TV-195 *	6153 *		136 Microbeurtes-wound on 5600Ω resistor
L11	2nd. Sound IF	8-41899	17-1021 ②				
L12	Quadrature Coil	8-19020		TV-121			

* Parallel with 5600Ω resistor.
e Enlarge mounting holes.
Note 1. Alternate part #8-41890.

TRANSFORMER (HORIZ. OSC.)

ITEM No.	DC RES		REPLACEMENT DATA						NOTES
	PRI	SEC.	ZENITH PART No.	Meissner PART No.	Merit PART No.	Miller PART No.	Ram PART No.	Thordarson PART No.	
L13	165Ω *		8-19743	19-1577	TV-169	6334		22-8	* Tapped ② 55Ω

FILTER CHOKE

ITEM No.	RATINGS			REPLACEMENT DATA						
	CURRENT (Measured)	DC RES.	INDUCTANCE @ CURRENT 1000 ~(.)	ZENITH PART No.	Halldorson PART No	Merit PART No.	Ram PART No	Stancor PART No	Thordarson PART No	Triad PART No
L14	.380A	82Ω	1.8 Hy.	95-1553 ① 95-1559 ②	C6057 ①	C-3961 ③		C-2538 ③	36C44	C-17X

① Used in Ch. 17A3O, U, Q.
② Used in Ch. 17A2LQ.
③ Drill new mounting hole.

COMPONENT COMBINATIONS

ITEM No	USE	DESCRIPTION	ZENITH PART No	REPLACEMENT DATA
E1	Vert. Integrator	680mmf, 680mmf, 680mmf, 47K, 47K	87-5	
K3	Vert. Feedback		87-4	

FUSES

ITEM No.	TYPE	RATING	REPLACEMENT DATA						NOTES
			ZENITH PART No.		LITTELFUSE PART No.		BUSS PART No.		
			FUSE	HOLDER	FUSE	HOLDER	FUSE	HOLDER	
M1	N	4/10A 125V 8/5	136-35	63-18	313.400 (N 4/10A-125V - 8/5)	346009	N 4/10	HN 3/10 to 1/2	

CRYSTAL DIODES

ITEM No.	ORIG. TYPE	REPLACEMENT DATA			NOTES
		ZENITH PART No.	CBS PART No.	SYLVANIA PART No.	
M2	1N84	103-23	1N84	1N90	Video Detector (Pigtail)

ZENITH MODELS A2221J, JU, Y, YU, A2223E, EU, H, HU, R, RU, Y, YU, A2245E, EU, R, RU, A2250M, MU, R, RU, A2251E, EU, R, RU, A2322E, EU, R, RU, A2673E, EU, R, RU, A3000E, R, A3001H, R, A3004S, R, A3006S, H, R, A3008S, R (Ch. 17A3O, Q, U, 17A3IQ)

PARTS LIST AND DESCRIPTIONS (Continued)

MISCELLANEOUS

ITEM No.	PART NAME	ZENITH PART No.	NOTES
M3	Tuner	S-41682	VHF - Models A2221J, Y
	Tuner	S-41692	VHF - Models A2223E, H, R, Y, A2245E, R, A2250M, R, A2251E, R, A2282E, R, A2673E, R, A3000E, R, A3001E, R, H, A3004, E, R, A3006E, H, R, A3008E, R
	Tuner	S-41683	UHF-VHF - Models A2221JU, YU
	Tuner	S-41693	UHF-VHF - Models A2223EU, HU, RU, YU, A2245EU, RU, A2250MU, RU, A2251EU, RU, A2282EU, RU, A2673EU, RU
	Tuner	S-41945	UHF
M4	Width Sleeve		
M5	Centering Device	S-23237	Includes yoke cover

CABINETS & CABINET PARTS

(When Ordering Cabinets & Cabinet Parts, Specify Model, Chassis & Color)

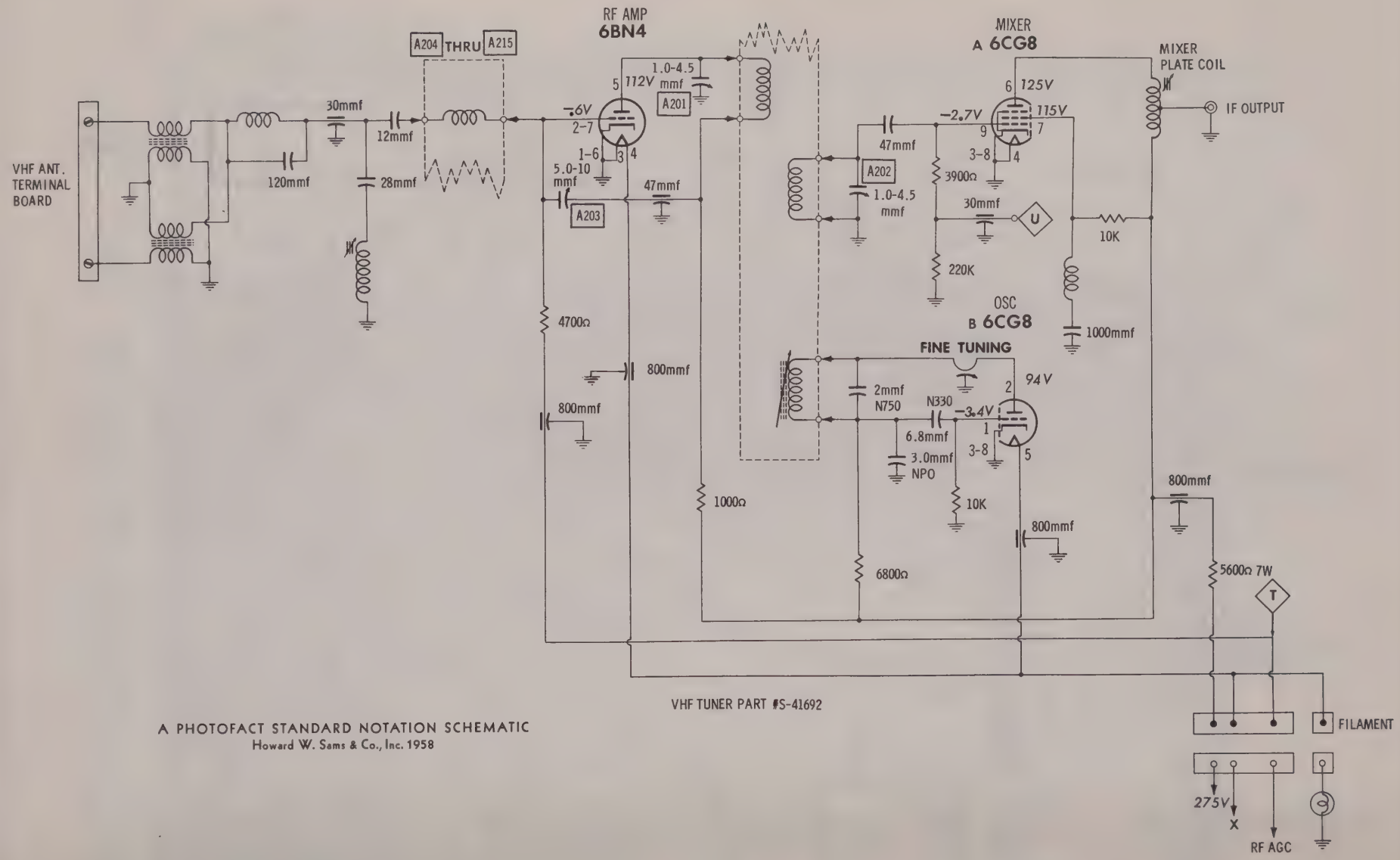
NAME	PART NO.	DESCRIPTION
Safety Glass	192-238	Models A2221J, JU, Y, YU
Safety Glass	192-239	Models A2223E, EU, H, HU, R, RU, Y, YU, A2245E, EU, R, RU, A2250M, MU, R, RU, A2251E, EU, R, RU, A2282E, EU, R, RU
Safety Glass	192-244	Models A2673E, EU, R, RU
Safety Glass	192-242	Models A3000E, R, A3001E, H, R, A3004, E, R, A3006E, H, R, A3008E, R
Knob	46-1704	Channel Selector - Models A2221Y, YU
Knob	46-1831	Channel Selector - Models A2221J, JU
Knob	S-41960	Channel Selector - Models A2223E, EU, H, HU, R, RU, Y, YU, A2245E, EU, R, RU, A2250M, MU, R, RU, A2251E, EU, R, RU, A2282E, EU, R, RU, A2673E, EU, R, RU
Knob	S-42044	Channel Selector - Models A3000E, R, A3001E, H, R, A3004, E, R, A3006E, H, R, A3008E, R
Knob	S-22863	Fine Tuning - Models A2221J, JU, Y, YU, A2223E, EU, H, HU, R, RU, Y, YU, A2245E, EU, R, RU, A2250M, MU, R, RU, A2251E, EU, R, RU, A2282E, EU, R, RU, A2673E, EU, R, RU
Knob	S-42039	Fine Tuning - Models A3000E, R, A3001E, H, R, A3004, E, R, A3006E, H, R, A3008E, R
Knob	S-42026	UHF Dial - Models A2221JU, YU
Knob	S-42058	UHF Dial - Models A2223EU, HU, RU, YU, A2245EU, RU, A2250MU, RU, A2251EU, RU, A2282EU, RU, A2673EU, RU
Knob	46-1833	On-off-volume - Models A2221Y, YU
Knob	46-1703	On-off-volume - Models A2221J, JU
Knob	46-1834	On-off-volume - Models A2223E, EU, H, HU, R, RU, Y, YU, A2245E, EU, R, RU, A2250M, MU, R, RU, A2251E, EU, R, RU, A2282E, EU, R, RU, A2673E, EU, R, RU
Knob	46-1806	On-off-volume - Models A3000E, R, A3001E, H, R, A3004E, R, A3006E, H, R, A3008E, R
Knob	S-41485	Brightness, vertical hold, tone
Knob	S-41946	Contrast
Knob	46-1118	Horiz. Hold
Cabinet	14-2239	Models A2221Y, YU
Cabinet	14-2238	Models A2221J, JU
Cabinet	14-2241	Models A2223E, EU
Cabinet	14-2242	Models A2223H, HU
Cabinet	14-2240	Models A2223R, RU
Cabinet	14-2248	Models A2223Y, YU
Cabinet	14-2299E	Models A2245E, EU
Cabinet	14-2299R	Models A2245R, RU
Cabinet	14-2279M	Models A2250M, MU
Cabinet	14-2279R	Models A2250R, RU
Cabinet	14-2283E	Models A2251E, EU
Cabinet	14-2283R	Models A2251R, RU
Cabinet	14-2309E	Models A2282E, EU
Cabinet	14-2309R	Models A2282R, RU
Cabinet	14-2301E	Models A2673E, EU
Cabinet	14-2301R	Models A2673R, RU
Cabinet	14-2247	Models A3000E, A3001E
Cabinet	14-2246	Models A3000R, A3001R
Cabinet	14-2249	Model A3001H
Cabinet	14-2297	Model A3004
Cabinet	14-2297E	Model A3004E
Cabinet	14-2297R	Model A3004R
Cabinet	14-2296E	Model A3006E
Cabinet	14-2296H	Model A3006H
Cabinet	14-2296R	Model A3006R
Cabinet	14-2281E	Model A3008E
Cabinet	14-2281R	Model A3008R

WIRING DATA

High Voltage Lead	Use BELDEN No.	8869
Shielded Hook-up Wire	Use BELDEN No.	8885 (Single Conductor)
		8738 (Two Conductor)
General-use Unshielded Hook-up Wire	Use BELDEN No.	8530 (Solid) Available in Ten Colors
		8524 (Stranded) Available in Ten Colors
Power Cord (Interlock Type)	Use BELDEN No.	8874
300Ω Tuner Input Lead	Use BELDEN No.	8225
300Ω Antenna Lead-in	Use BELDEN No.	8230 or 8275
Antenna Rotor Cable	Use BELDEN No.	8464 (Flat) or 8484 (Round) - 4 Conductor
		8485 (Round) - 5 Conductor
		8488 (Round) - 8 Conductor

ALTERNATE UHF-VHF TUNER SCHEMATIC

A PHOTOFACT STANDARD NOTATION SCHEMATIC
Howard W. Sams & Co., Inc. 1958



VHF TUNER PART #S-41692

A PHOTOFACT STANDARD NOTATION SCHEMATIC
Howard W. Sams & Co., Inc. 1958

ALTERNATE VHF TUNER SCHEMATIC

TUNER ALIGNMENT INSTRUCTIONS (cont)

UHF ALIGNMENT

Alignment of the UHF tuner should not be attemped unless proper test equipment is available. Switch the receiver to the UHF position. Connect 2 volts bias to the IF AGC line and adjust the sweep generator output to provide 3 volts peak to peak on the scope in the following steps. Connect the synchronized sweep voltage from the sweep generator to the horizontal input of the oscilloscope for horizontal deflection. Use 10MC sweep unless otherwise noted.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
13.	Fig. 203	Across UHF antenna terminals thru matching network (Fig. 203).	713MC	711.25MC	54	Vert. Amp. thru 10K across video detector load.	A218, A219, A220	Tuner rocker arm should be in a horizontal position. If necessary, loosen the set screw and adjust the tuner so that rocker arm is horizontal when the channel selector is set at channel 54. Do not adjust A218 unless oscillator calibration is off more than 3 channels. If necessary, adjust A218 to place video marker at 50% on response curve as in Fig. 202. The image (weaker response) will appear also. The response toward the counter clockwise position of A218 is the proper response. Adjust A219 and A220 for maximum amplitude of response similar to Fig. 202.
14.	"	"	473MC	471.25MC	14	"		Check for response similar to Fig. 202. If the oscillator is off more than 3 channels, adjust the oscillator travel (oscillator, mixer and antenna travel adjustments are the 3 round screws on top of the UHF tuner) adjustment to scale. Care must be used in making this adjustment so as not to move the rocker arm out of its bearing. Set the mixer and antenna travel adjustments for maximum response on scope.
15.	"	"	887MC	885.25MC	83	"	A221, A222, A223	Adjust A221 to place marker at 50% as in Fig. 202. Adjust A222 and A223 for maximum gain and symmetry similar to Fig. 202.

TUNER PARTS LIST AND DESCRIPTIONS

TUBES (GENERAL ELECTRIC, SYLVANIA)

ITEM No.	USE	TYPE	NOTES
V201	RF Amp.	6BK7A	
V202	Mixer-Osc.	6U8	

FIXED CAPACITORS

Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING CAP.	RATING VOLT	REPLACEMENT DATA ZENITH PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ERIE PART No.	MALLORY PART No.	SPRAGUE PART No.	NOTES
C201	12		22-2679	SI 12	D6-120	LT6Q12	GP-12	UC-5412	5GA-Q12	
C202	18	1000	22-2680							5%
C203	18	1000	22-2680							5%
C204	12		22-2679	SI 12	D6-120	LT6Q12	GP-12	UC-5412	5GA-Q12	
C205	3.3		22-2343	NPO-SI 3.3	TCZ-3R3	C10V33C	TCO-3.3	ZT-5533	5TCCB-V33	
C206	8.2		22-2681	NPO-SI 8.2		C10V82C	TCO-8.2			NPO 5%
C207	1.8		22-2428							
C208	1000		22-2889	EF-001	MFT-1000				503C-D1	
C209	1000		22-2889	EF-001	MFT-1000				503C-D1	
C210	25		22-2671	N750-SI 2.5	TCN-25	C10Q25U	TC7-25		5TCU-Q25	N750 10%
C211	1000		22-2889	EF-001	MFT-1000				503C-D1	
C212	1.0		22-2720	NPO-SI1.0	TCZ-1		TCO-1		5TCCB-V1	
C213	1.0		22-2714							N1500 10%
C214	5		22-2716							N330 5%
C215	5		22-2716							N330 5%
C216	1000		22-2889	EF-001	MFT-1000				503C-D1	
C217	1000		22-2889	EF-001	MFT-1000				503C-D1	

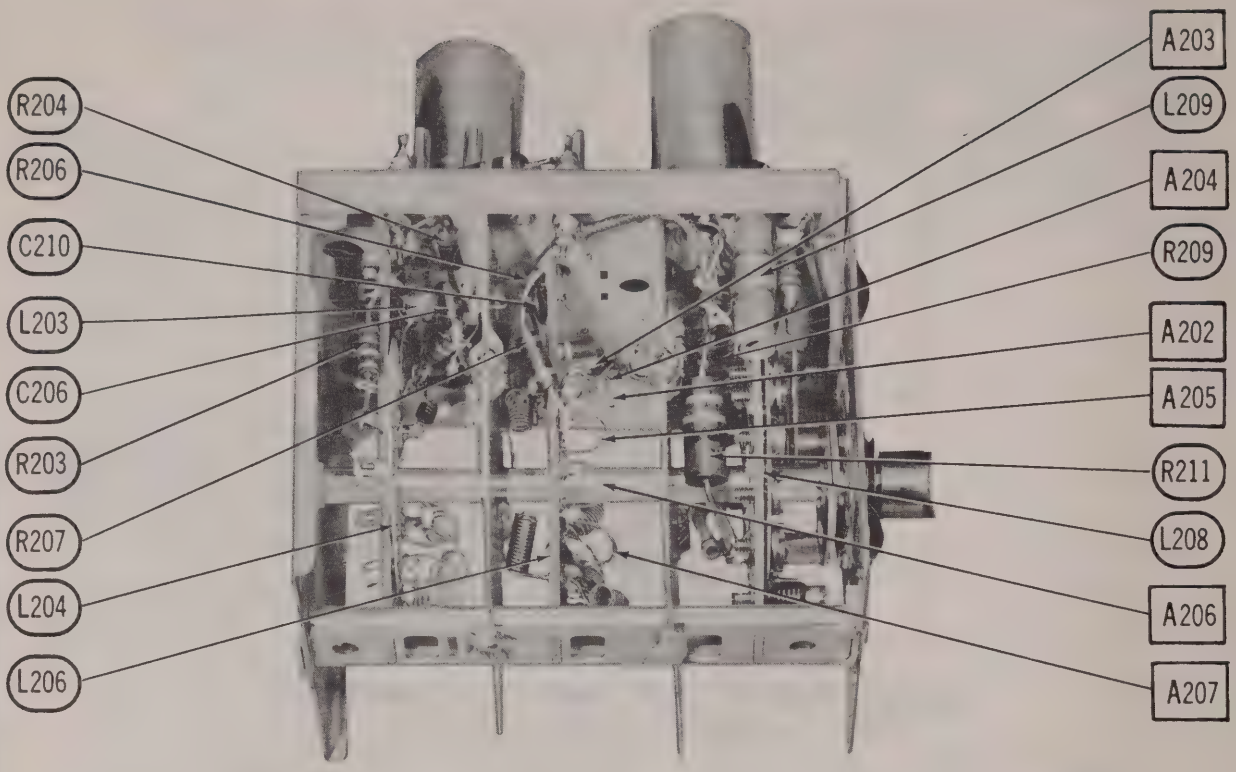
RESISTORS

All wattages 1/2 watt, or less, unless otherwise listed.

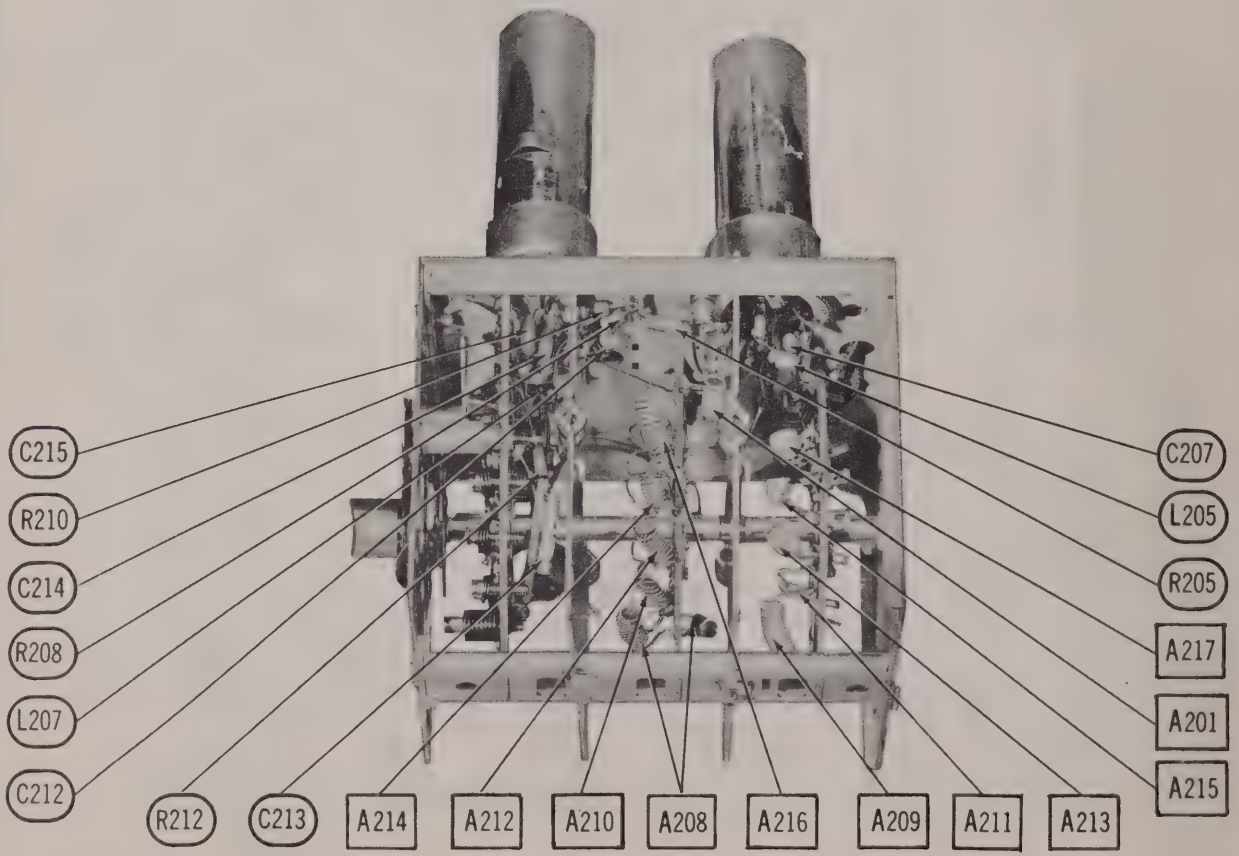
ITEM No.	RATING OHMS	RATING WATT	ZENITH PART No.	NOTES
R201	230K			
R202	230K			
R203	22K			
R204	2.2meg			
R205	120K			
R206	100K			
R207	1200Ω			
R208	100K			
R209	100K			
R210	10K			
R211	10K	2	63-3176	
R212	4700Ω			
R213	470Ω	2	63-2398	

COILS (RF-IF)

ITEM No.	USE	ZENITH PART No.	NOTES
L201	IF Trap Coil	20-567	
L202	IF Trap Coil	20-567	
L203	Ant. Trans.	S-24644	Alt. part #24645
L204	Ant. Coils	S-23641	Channel 2-13 Wafer Assy.
L205	Neut. Coil	20-633	
L206	RF Coils	S-23640	Channel 2-13 Wafer Assy.
L207	Mixer Screen Coil	20-632	
L208	Osc. Coils	S-41807	Channel 2-13 Wafer Assy.
L209	Mixer Plate Coil	S-41665	



TUNER-LEFT SIDE



TUNER-RIGHT SIDE

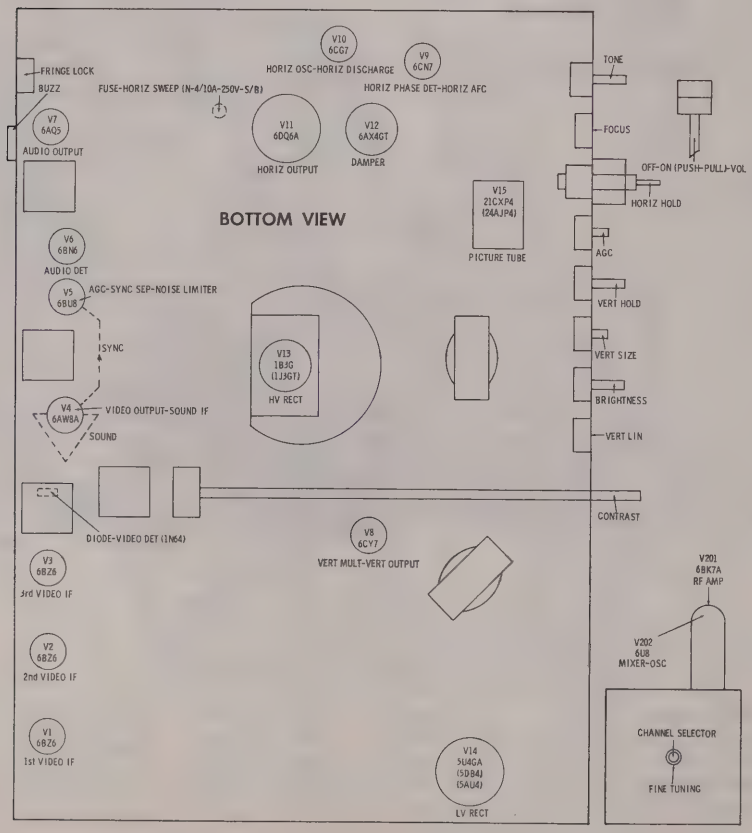
CHASSIS-TOP VIEW

ZENITH MODELS A2221J, JU, Y, YU, A2223E, EU, H, HU, R, RU, Y, YU, A2245E, EU, R, RU, A2250M, MU, R, RU, A2251E, EU, R, RU, A2282E, EU, R, RU, A2673E, EU, R, RU, A3000E, R, A3001E, H, R, A3004E, R, A3006E, H, R, A3008E, R (Ch. 17A20, Q, U, 17A21Q)

RESISTANCE MEASUREMENTS

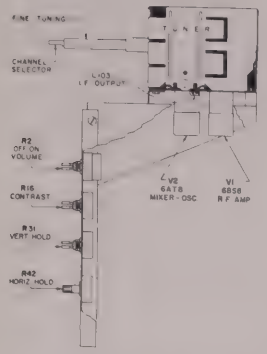
ITEM	TUBE	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Pin 9
V1	6BZ6	700K	1500Ω	.1Ω	0Ω	††240Ω	††240Ω	0Ω		
V2	6BZ6	60K	††22Ω	.1Ω	0Ω	†220Ω	†220K	INF		
V3	6BZ6	.1Ω	120Ω	.1Ω	0Ω	†8200Ω	†8200Ω	0Ω		
V4	6AW8A	0Ω	100K	†37K	.1Ω	0Ω	47Ω	2700Ω	†23K	†5700Ω
V5	6BU8	0Ω	†27K	†380K	.1Ω	0Ω	•160Ω	•†1meg	†33K	3.5meg
V6	6BN6	•230Ω	.2Ω	.1Ω	0Ω	†27K	4.4Ω	†390K		
V7	6AQ5	• 0Ω	680Ω	.1Ω	0Ω	†1358Ω	†470Ω	• 0Ω		
V8	6CY7	†420Ω	NC	2.2meg	0Ω	.1Ω	• ‡5meg	• 550K	0Ω	•1500Ω
V9	6CN7	0Ω	200K	100K	0Ω	.1Ω	680Ω	1.2meg	†47K	NC
V10	6CG7	‡200K	67K	0Ω	0Ω	.1Ω	†0Ω	33K	11K	0Ω
V11	6DQ6A	TP	.1Ω	TP	†10K	1meg	TP	0Ω	0Ω	TOP CAP ‡16Ω
V12	6AX4GT	NC	TP	¶	NC	†0Ω	NC	0Ω	.1Ω	
V13	1B3GT	PINS 1 THRU 8 HAVE INFINITE RESISTANCE								TOP CAP ‡266Ω
V14	5U4GA	NC	¶	TP	30Ω	NC	27Ω	TP	¶	
V15	21CXP4	0Ω	27K	PIN 6 • ‡60K	PIN 10 †60K	PIN 11 • 180K	PIN 12 .1Ω			
V201	6BK7A	†1700Ω	55K	INF	0Ω	.1Ω	INF	1.2meg	0Ω	0Ω
V202	6U8	†10K	100K	†100K	0Ω	.1Ω	†470Ω	0Ω	0Ω	10K

¶ THIS READING CAN VARY GREATLY, (10K MINIMUM), DUE TO THE CONDITION OF THE ELECTROLYTIC CAPACITOR CONNECTED IN THE ASSOCIATED CIRCUIT.
• THIS READING WILL VARY. CONTROL SET FOR NORMAL OPERATION.
† MEASURED FROM 275V SOURCE.
‡ MEASURED FROM PIN 3 OF V12.
†† MEASURED FROM PIN 7 OF V2.
NC NO CONNECTION.
TP TIE POINT.

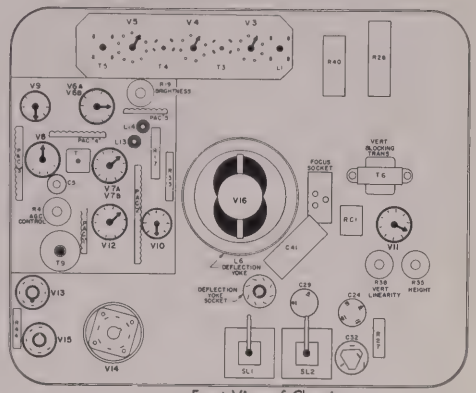


TUBE PLACEMENT CHART

The service information in this Servicer provides data on models which we have been unable to present in PHOTOFACT Folders. The receivers are not in current production; a requirement for PHOTOFACT coverage, and we are therefore presenting schematics and supplementary data that will be of assistance when servicing these models.

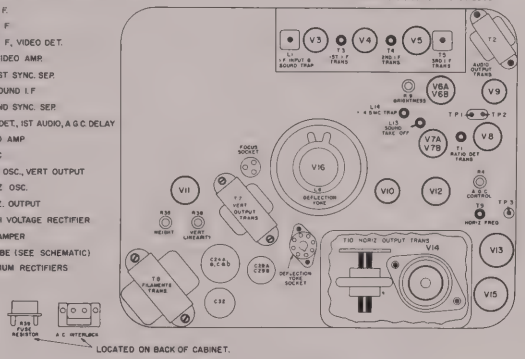


Top View of Tuner and Control Panel

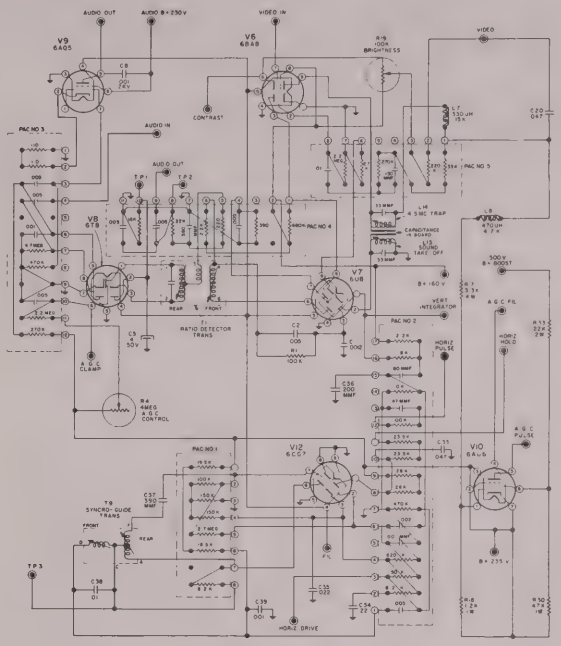


Front View of Chassis

V3, 6CB6-1ST I.F.
V4, 6CB6-2ND I.F.
V5, 6AM8-3RD I.F., VIDEO DET.
V6A, 1/2 6BA8-VIDEO AMP.
V6B, 1/2 6BA8-1ST SYNC. SEP.
V7A, 1/2 6U8-SOUND I.F.
V7B, 1/2 6U8-2ND SYNC. SEP.
V8, 6T8-RATIO DET., 1ST AUDIO, A.G.C. DELAY
V9, 6AQ5-AUDIO AMP.
V10, 6AU6-A.G.C.
V11, 6CM7-VERT. OSC., VERT. OUTPUT
V12, 6CG7-HORIZ. OSC.
V13, 6AV5-HORIZ. OUTPUT
V14, 1B3/GT-HIGH VOLTAGE RECTIFIER
V15, 6AX4/GT-DAMPER
V16, PICTURE TUBE (SEE SCHEMATIC)
SL1, SL2, SELENIUM RECTIFIERS



Rear View of Chassis

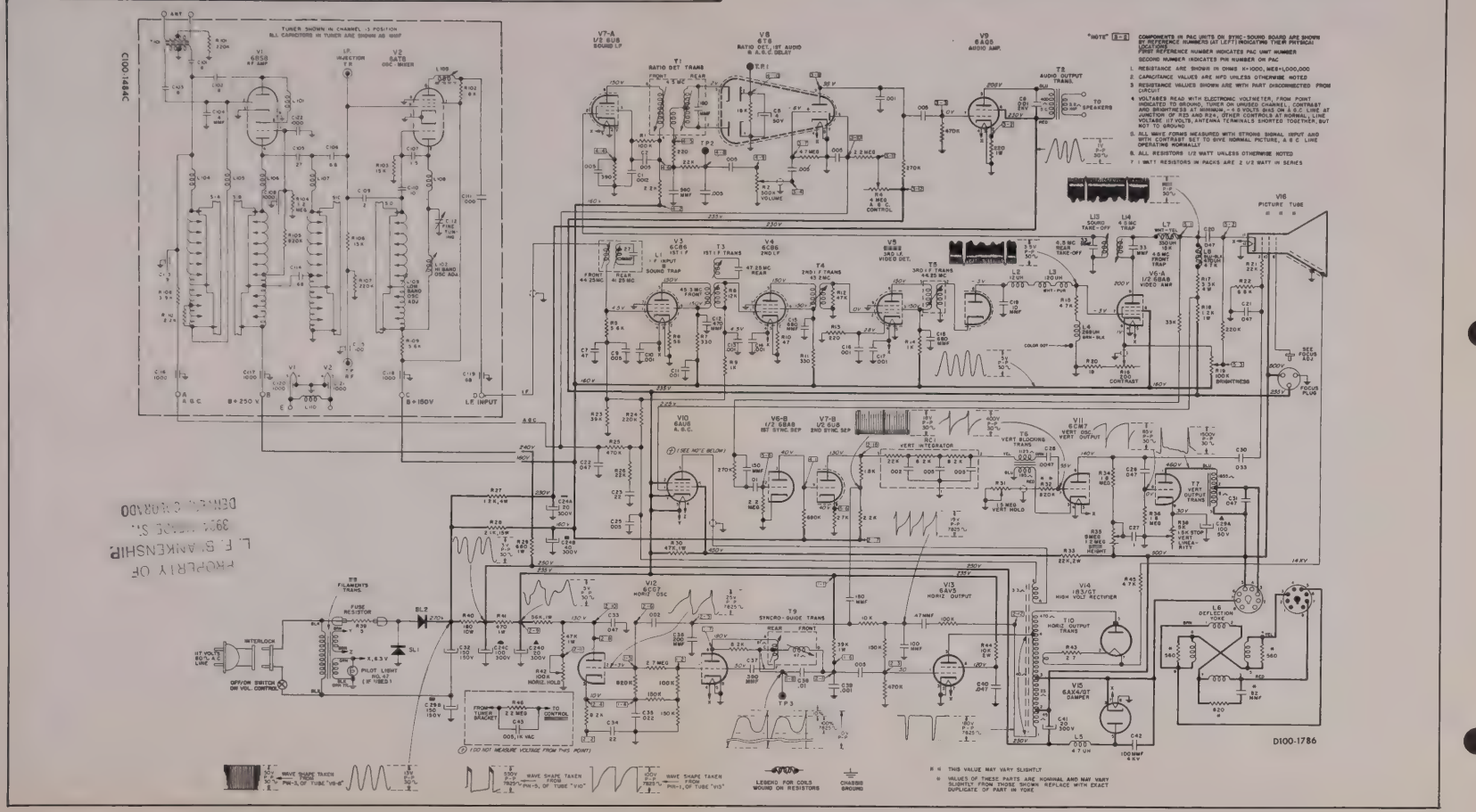


The PHOTOFACT Servicer

SET 393 ★ Published for all users of Howard W. Sams' Photofact Folders ★ MARCH 1, 1958

SILVERTONE CHASSIS 528.51040 (MODELS 7114, 7116, 7120, 7122, 7124, 7128, 7130, 7136, 7172, 7190, 7192)

SCHEMATIC DIAGRAM COURTESY SEARS, ROEBUCK AND COMPANY



PROPERTY OF
L. F. SWANKENSHIR
DENVER, COLORADO

PHOTOFACT* Folder

EIA MEMBER ELECTRONIC INDUSTRIES ASSOC.

PRODUCTION CHANGES BULLETIN 203

SUPPLEMENTAL DATA TO PHOTOFACT FOLDER 14 IN SET 347

RCA VICTOR MODELS 21T7112, U, 21T7113, U, 21T7117, U, 21T7152, U, 21T7153, U, 21T7157, U, 21T7352, U, 21T7355, U, 21T7375, G, GU, U, 21T7377, G, GU, U (Ch. KCS98A, C, E, F, J, K, L, M)

	RCA Victor Models 21T7112, U, 21T7113, U, 21T7117, U, 21T7152, U, 21T7153, U, 21T7157, U, 21T7352, U, 21T7355, U and 21T7357, U (Ch. KCS98A, C, E, F) were covered in Photofact Folder 14 — Set 347. Models 21T7375, G, GU, U, 21T7377, G, GU, U (Ch. KCS98J, K, L, M) are added, along with late production changes, with the publication of this bulletin.
Ch. KCS98A, C, E, F	COMPONENT CHANGES C76 is decreased from .01mfd to .001mfd. C71 is increased from 470mmf to 10000mmf. R102 is decreased from 150K to 120K.
Ch. KCS98L	VHF TUNER CHANGED Chassis KCS98L uses VHF tuner #KRK60A. A schematic of the new tuner is given in Figure 1. This portion of the receiver has been properly aligned at the factory and is very stable. Alignment of this portion should not be required in the field.
Ch. KCS98M	VHF/UHF TUNER CHANGED Chassis KCS98M uses VHF tuner #KRK60B and UHF tuner #KRK36K. A schematic of the new tuner is given in Figure 2. This portion of the receiver has been properly aligned at the factory and is very stable. Alignment of this portion should not be required in the field.
Ch. KCS98J, K, L, M	COMPONENT CHANGES R1A, B, C (Contrast, Volume, On-off Switch) is changed to part #103571. R2A (Brightness control) is changed to part #103572. R3A (Vertical Hold control) is changed to part #103573. L40 (Horiz. Freq. coil) is changed to part #103570. Replacement data for the part is given in the chart below.

TRANSFORMER (HORIZ. OSC.)

ITEM No.	DC RES.		REPLACEMENT DATA						NOTES
	PRI.	SEC.	RCA Victor PART No.	Meissner PART No.	Merit PART No.	Miller PART No.	Ram PART No.	Thordarson PART No.	
L40	65Ω *		103570		TV-165			HS-7	* Tapped @ 45Ω

(Continued on Reverse Side)

PROPERTY OF
L. F. BLANKENSHIP
3024 MEADE ST.
DENVER COLORADO

HOWARD W. SAMS & CO., INC. • Indianapolis 5, Indiana

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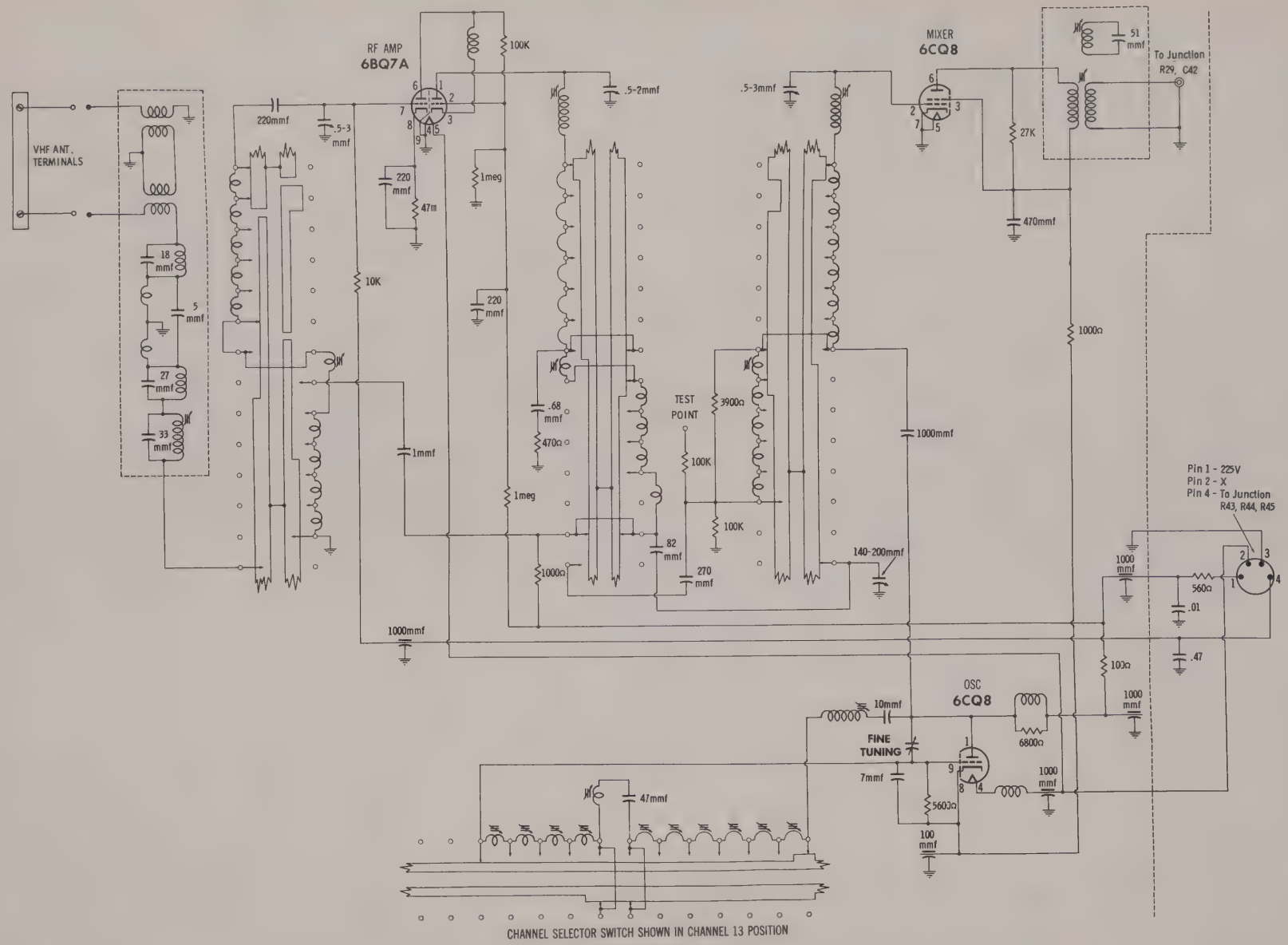


CHANNEL SELECTOR SWITCH SHOWN IN CHANNEL 13 POSITION

VHF TUNER ØKRK60-A

FIG. 1

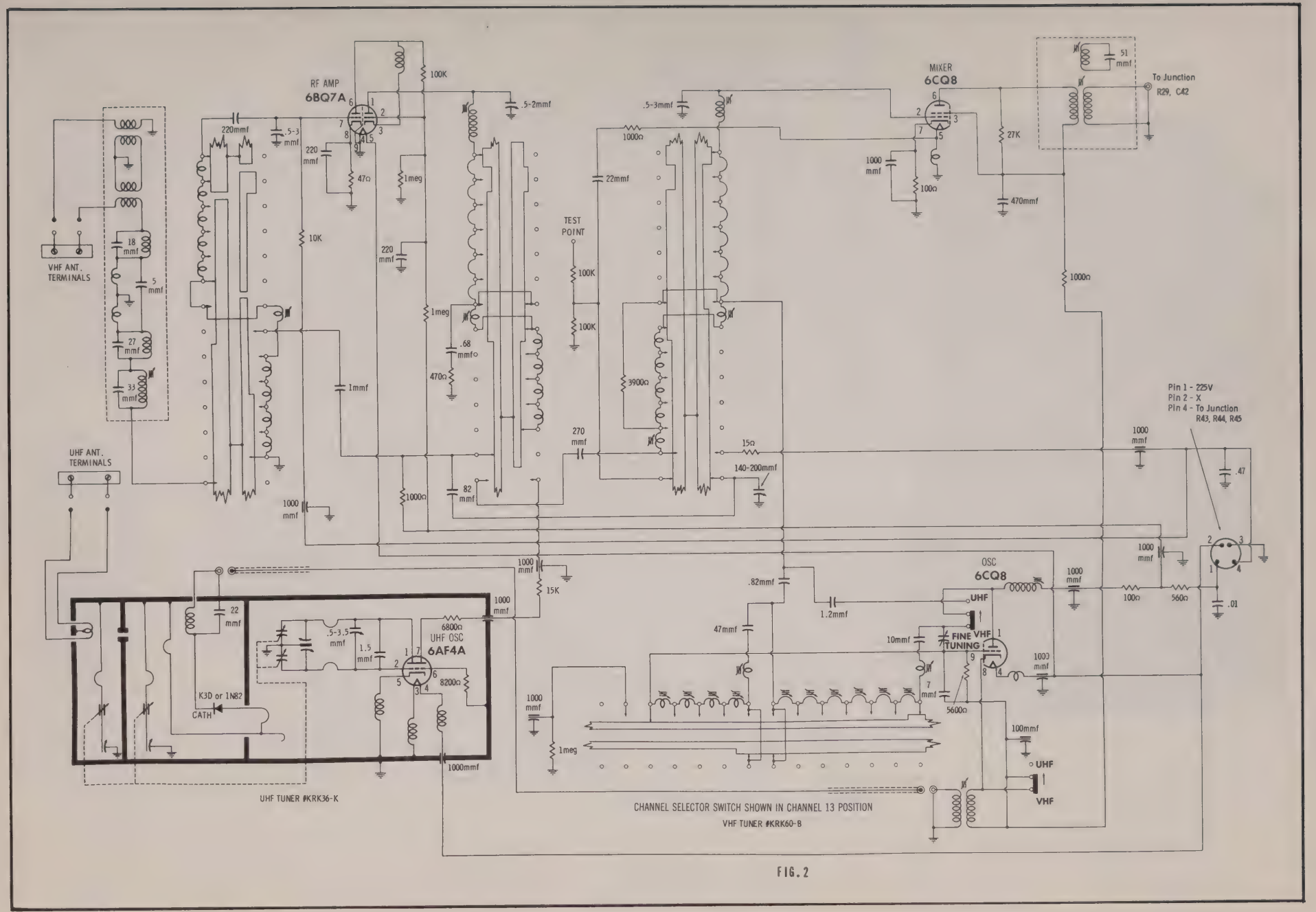

RF AMP
6BQ7A
MIXER
6CQ8
OSC
6CQ8
UHF OSC
6AF4A
VHF ANT. TERMINALS
UHF ANT. TERMINALS
TEST POINT
To Junction R29, C42
Pin 1 - 225V
Pin 2 - X
Pin 4 - To Junction R43, R44, R45
K3D or 1N82
CATH
FINE TUNING
UHF
VHF
UHF TUNER #KRK36-K
CHANNEL SELECTOR SWITCH SHOWN IN CHANNEL 13 POSITION
VHF TUNER #KRK60-B

FIG. 2

PHOTOFACT* Folder

EIA MEMBER

ARVIN MODEL 5578 (Ch. 1.43500)

PROPERTY OF
L. F. BLANKENSHIP
3924 MEADE ST.
DENVER, COLORADO

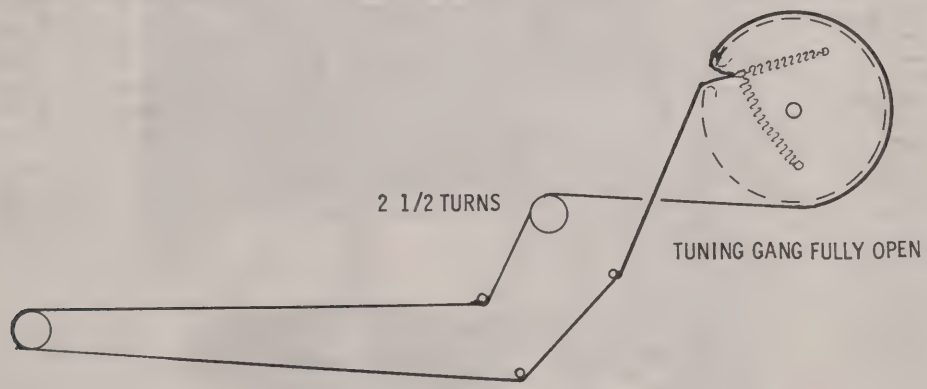
ARVIN MODEL 5578 (Ch. 1.43500)

TRADE NAME	Arvin Model 5578 (Ch. 1.43500)
MANUFACTURER	Arvin Industries, Inc., Columbus, Indiana
TYPE SET	AC Operated AM Receiver With Electric Clock
TUBES (Five)	Types 12BE6 Converter, 12BA6 IF Amplifier, 12AV6 Det.-AVC-AF Amp., 50C5 Output, 35W4 Rectifier
POWER SUPPLY	105-125 Volts AC-60 Cycles
RATING	.31 Amp. @ 117 Volts AC (31 Watts)
TUNING RANGE—BROADCAST	540-1670KC

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

Use isolation transformer, if available. If not, connect a .1mfd capacitor in series with low side of signal generator and B-. Volume control should be at maximum position. Output of signal generator should be no higher than necessary to obtain an output reading. Use an insulated alignment screwdriver for adjusting.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
1.	.05mfd	High side to pin 7 (grid) of 12BE6 (V1). Low side to B-.	455KC (400~ Mod)	Tuning gang fully open	Across voice coil	A1, A2, A3, A4	Adjust for maximum output.
2.		Loop	1670KC	"	"	A5	Fashion loop of several turns of wire and radiate signal into loop of receiver. Adjust for maximum output.
3.		"	1400KC	1400KC	"	A6	Fashion loop of several turns of wire and radiate signal into loop of receiver. Adjust for maximum output. Repeat for greatest accuracy.



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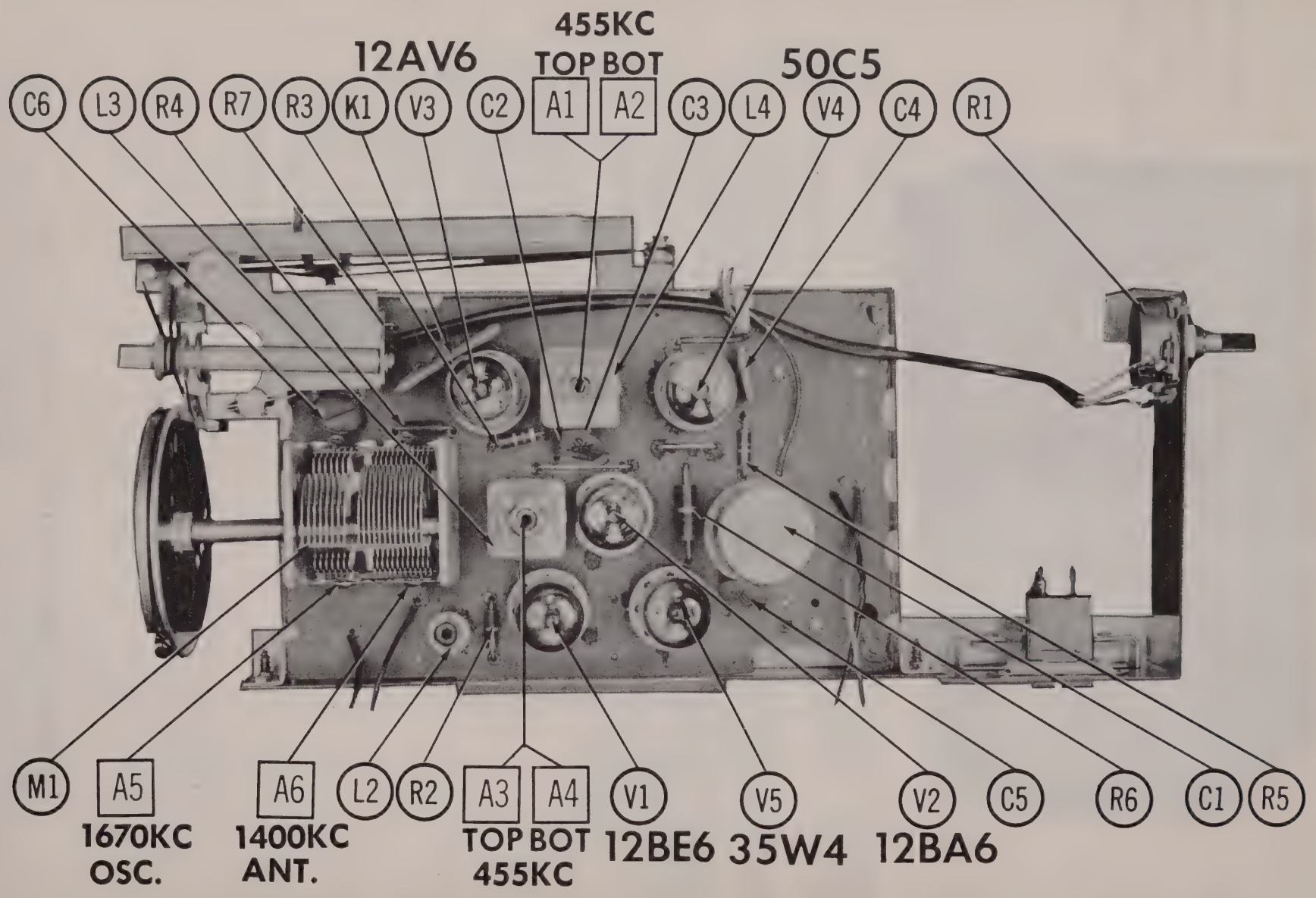


CHASSIS TOP VIEW

PARTS LIST AND DESCRIPTIONS

TUBES (GENERAL ELECTRIC, SYLVANIA)

ITEM No.	USE	TYPE	NOTES
V1	Converter	12BE6	
V2	IF Amplifier	12BA6	
V3	Det. - AVC - AF Amp.	12AV6	
V4	Output	50C5	
V5	Rectifier	35W4	

ELECTROLYTIC CAPACITORS

ITEM No.	RATING CAP.	RATING VOLT.	REPLACEMENT DATA ARVIN PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	PYRAMID PART No.	SANGAMO PART No.	SPRAGUE PART No.
C1A	■50	150	43672	AFH2-15-05	BBRD5315	PFP213.1	TDLD-8	MTD-301	
B	▲30	150							

FIXED CAPACITORS

Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING CAP.	RATING VOLT	REPLACEMENT DATA ARVIN PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ERIE PART No.	MALLORY PART No.	SPRAGUE PART No.	NOTES
C2	20000			BPD-02	DD-203	BYB6S2	ED-02		5HK-S2	N220
C3	150									
C4	10000			BPD-01	DD-103	BYA6S1	ED-01	DC511	5HK-S1	
C5	20000			BPD-02	DD-203	BYB6S2	ED-02		5HK-S2	
C6	20000			BPD-02	DD-203	BYB6S2	ED-02		5HK-S2	

CONTROLS

ITEM No.	RATING RESISTANCE	RATING WATTS	REPLACEMENT DATA ARVIN PART No.	CENTRALAB PART No.	CLAROSTAT PART No.	IRC PART No.	MALLORY PART No.	INSTALLATION NOTES
R1A	1meg	½	43483	B-70	A47-1meg-Z	Q13-137	U53	Volume
B	Shaft			Not Req.	FS-3	Not Req.	Not Req.	

RESISTORS

All wattages 1/2 watt, or less, unless otherwise listed.

ITEM No.	RATING OHMS	RATING WATT	ARVIN PART No.	NOTES
R2	22K			
R3	47K			
R4	2.2meg			
R5	120Ω			
R6	1200Ω	1		
R7	330K			

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	IMPEDANCE PRI.	IMPEDANCE SEC.	REPLACEMENT DATA ARVIN PART No.	Halldorson PART No.	Merit PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.	NOTES
T1	2700Ω	3-4Ω	42700-20	Z1101	A-3025	A-3332	24S53	S-12X	

PARTS LIST AND DESCRIPTIONS (Continued)

SPEAKER

ITEM No.	TYPE SIZE	TYPE FIELD	TYPE V. C. IMP.	REPLACEMENT DATA ARVIN PART No.	REPLACEMENT DATA QUAM PART No.	NOTES
SP1	4"	PM	3-4Ω	43096	4A07	

COILS (RF-IF)

ITEM No.	USE	REPLACEMENT DATA ARVIN PART No.	Meissner PART No.	Merit PART No.	Miller PART No.	Ram PART No.	NOTES
L1	Loop Ant.	①					Includes cabinet back
L2	Osc. Coil	43644-1					
L3	Input IF	44282-1	16-6780	BC-356	13-PC9	RF-4	
L4	Output IF	44282-1	16-6780	BC-357	13-PC10	RF-4	

① Some versions may use a loop stick antenna Part #45104-1.

COMPONENT COMBINATIONS

ITEM No.	USE	DESCRIPTION	ARVIN PART No.	REPLACEMENT DATA
K1	Audio Coup. Net.	5000mmf, 5000mmf, 220mmf, 125mmf, 125mmf, 6.8meg, 470K, 470K	43743-2	Aerovox PA-512 Centralab PC-158 Sprague DT-5

MISCELLANEOUS

ITEM No.	PART NAME	ARVIN PART No.	NOTES
M1	Tuning Cap	44939	2 Gang (Ant. 20-350mmf)
M2	Clock	45066-061	

CABINETS & CABINET PARTS

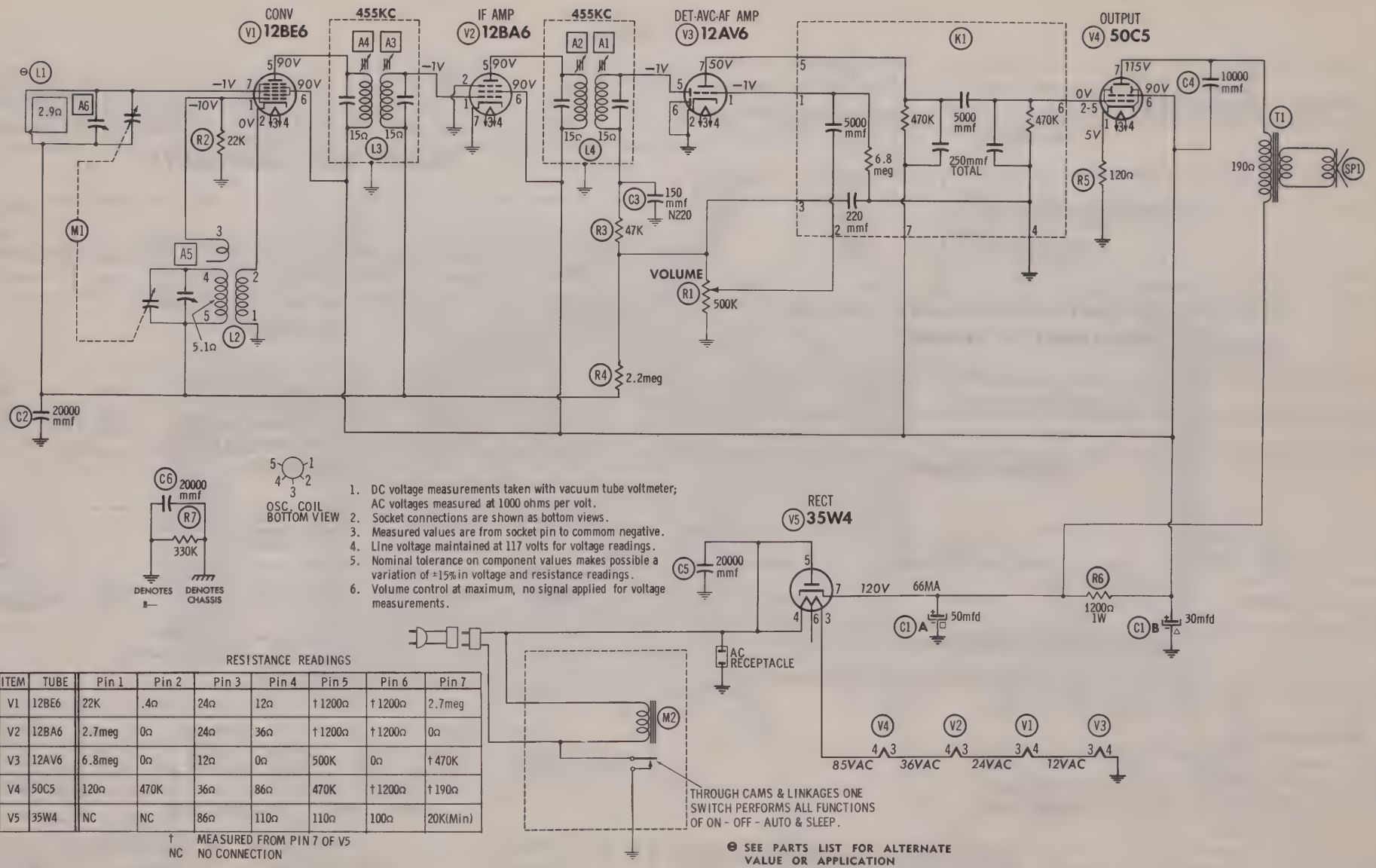
(When Ordering Cabinets & Cabinet Parts, Specify Model, Chassis & Color)

NAME	PART NO.	DESCRIPTION
Knob	43466-17	Volume, Tuning (Ivory)
Knob	43466-73	Volume, Tuning (Flame)
Knob	45131	Clock
Cabinet	45124-17	Includes Nameplate & Clock Crystal (Ivory)
Cabinet	45124-73	Includes Nameplate & Clock Crystal (Flame)
Crystal	45148	Clock
Dial Pointer	43477	

WIRING DATA

General-use Unshielded Hook-up Wire ..... Use BELDEN No. 8530 (Solid) Available in Ten Colors
8524 (Stranded) Available in Ten Colors

Power Cord ..... Use BELDEN No. 1765-B (6 Ft. Length)
1725-K (7½ Ft. Length)



1. DC voltage measurements taken with vacuum tube voltmeter; AC voltages measured at 1000 ohms per volt.
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to commom negative.
4. Line voltage maintained at 117 volts for voltage readings.
5. Nominal tolerance on component values makes possible a variation of ±15% in voltage and resistance readings.
6. Volume control at maximum, no signal applied for voltage measurements.

RESISTANCE READINGS

ITEM	TUBE	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7
V1	12BE6	22K	.4Ω	24Ω	12Ω	†1200Ω	†1200Ω	2.7meg
V2	12BA6	2.7meg	0Ω	24Ω	36Ω	†1200Ω	†1200Ω	0Ω
V3	12AV6	6.8meg	0Ω	12Ω	0Ω	500K	0Ω	†470K
V4	50C5	120Ω	470K	36Ω	86Ω	470K	†1200Ω	†190Ω
V5	35W4	NC	NC	86Ω	110Ω	110Ω	100Ω	20K(Min)

† MEASURED FROM PIN 7 OF V5
NC NO CONNECTION

Θ SEE PARTS LIST FOR ALTERNATE VALUE OR APPLICATION

DC COIL RESISTANCE VALUES UNDER ONE OHM NOT SHOWN ON SCHEMATIC DIAGRAM

A PHOTOFACT STANDARD NOTATION SCHEMATIC
Howard W. Sams & Co., Inc. 1958

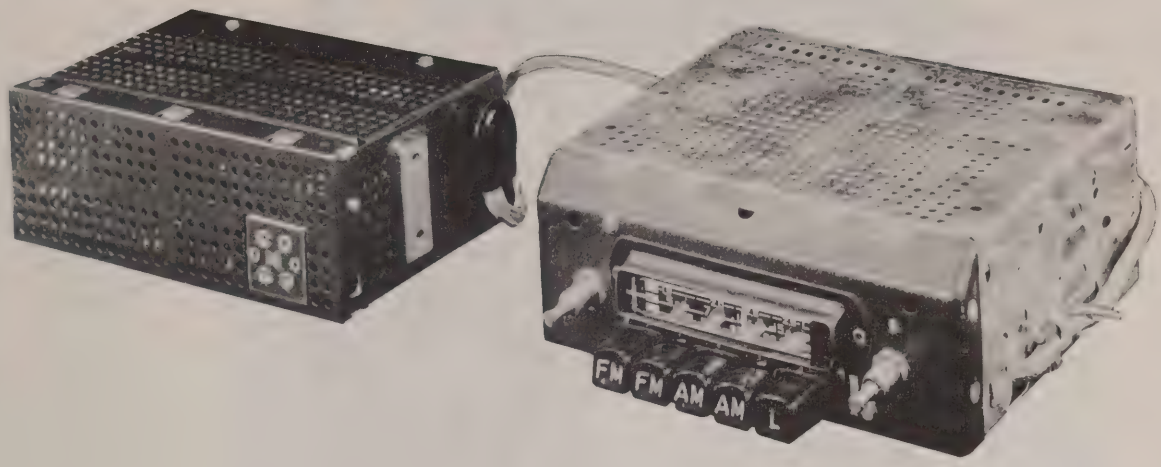
PHOTOFACT* Folder

EIA MEMBER

BLAUPUNKT MODELS
Frankfurt 12V, Frankfurt 6V

TY OF
L. F. BLANKENSHIP
3924 MEADE ST.
DENVER, COLORADO

BLAUPUNKT MODELS
Frankfurt 12V, Frankfurt 6V



BLAUPUNKT MODELS
Frankfurt 12V, Frankfurt 6V

TRADE NAME	Blaupunkt Model Frankfurt	
SUPPLIER	Robert Bosch Corp., 40-25 Crescent St., Long Island City 1, N. Y.	
TYPE SET	Battery Operated Universal Type FM-BC-LW Automobile Receiver	
TUBES (Six)	Types 6AQ8/ECC85 FM RF Amp.-FM Conv., EF89 1st FM IF Amp.-AM RF Amp., 6AJ8/ECH81 2nd FM IF Amp.-AM Mixer-AM Osc., EF89 3rd FM-1st AM IF Amp., 6T8/EABC80 Ratio Det.-AM Det.-AVC-AF Amp., 6BQ5/EL84 Output	
POWER SUPPLY	12 Volt Storage Battery (12 Volt version) 6 Volt Storage Battery (6Volt versions)	RATING 3.8 Amp. @12.6 Volts DC 7.6 Amp. @6.3 Volts DC
TUNING RANGE	BROADCAST 550-1600KC FREQ. MOD. 88-105MC	LONG WAVE 150-300KC

PUSHBUTTON ADJUSTMENT

NOTE: Pushbuttons can only be adjusted for the band designated on the button.

1. Allow receiver to warm up. Extend antenna.
2. Pull pushbutton out.
3. Tune manually to desired station.
4. Press pushbutton in firmly.

HOWARD W. SAMS & CO., INC. • Indianapolis 5, Indiana

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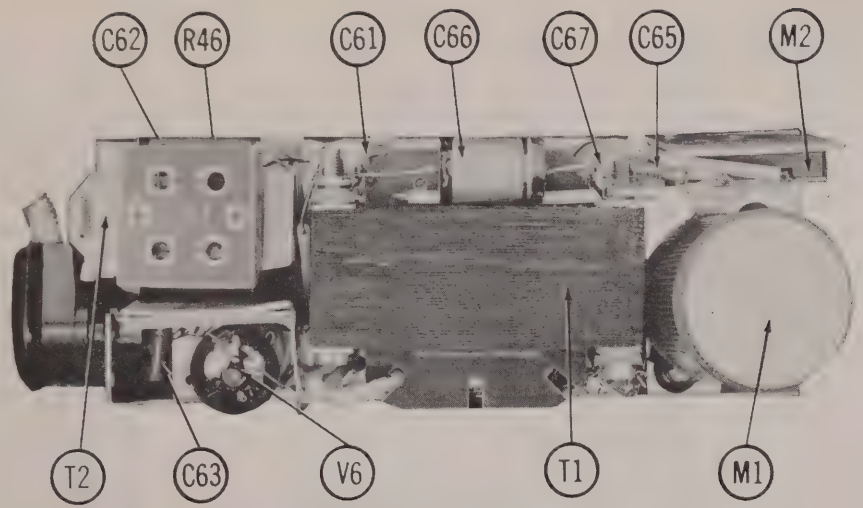
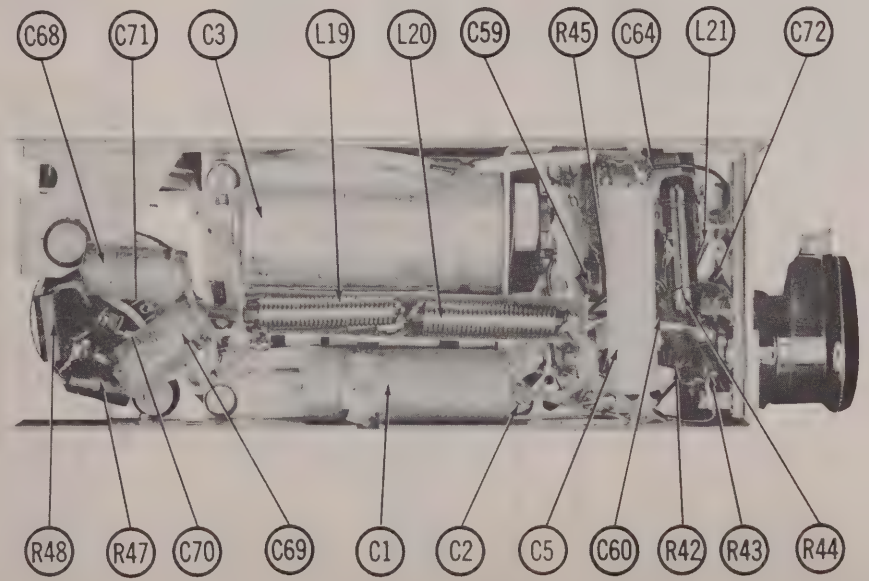
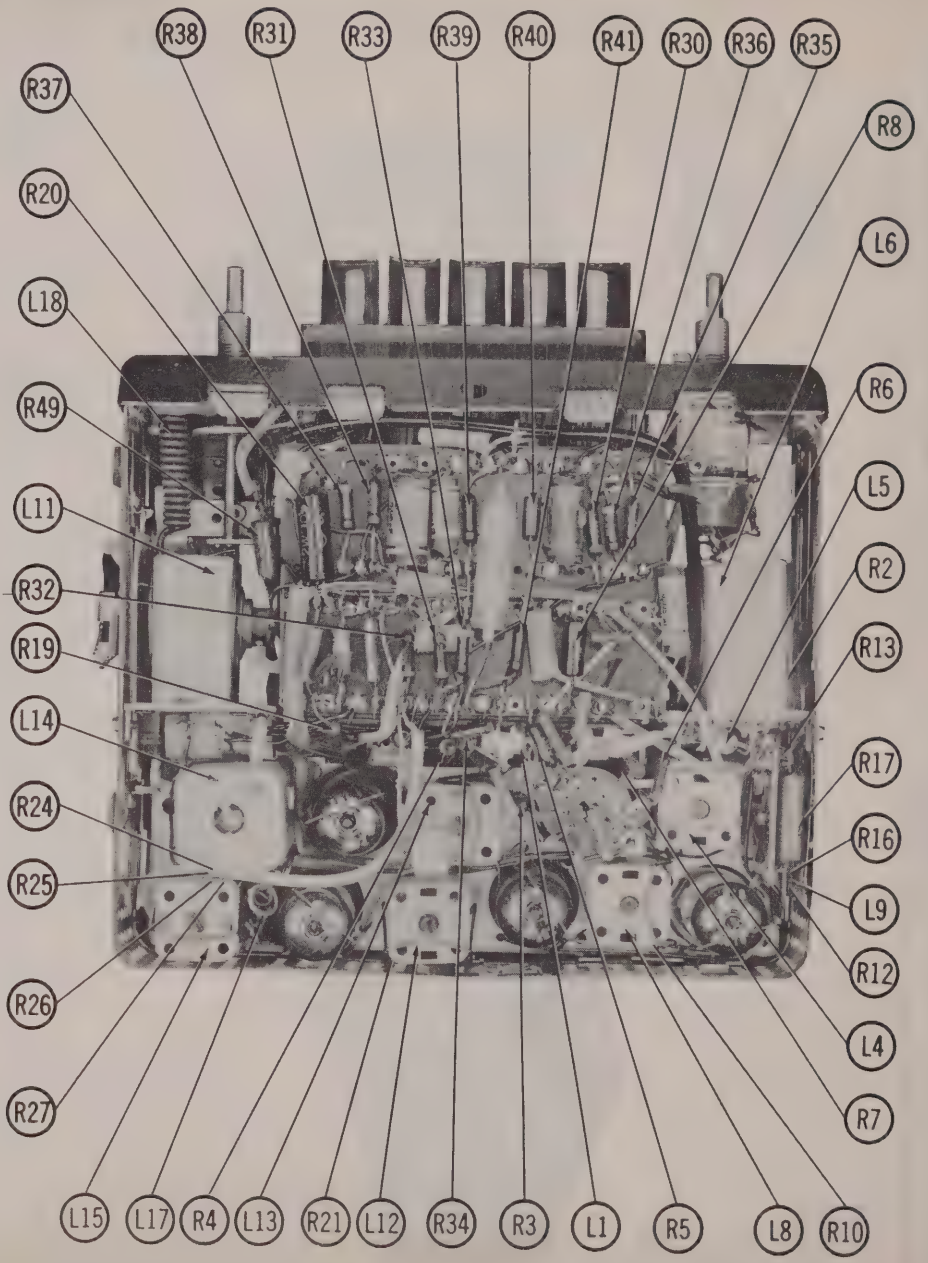


6BQ5
EL84

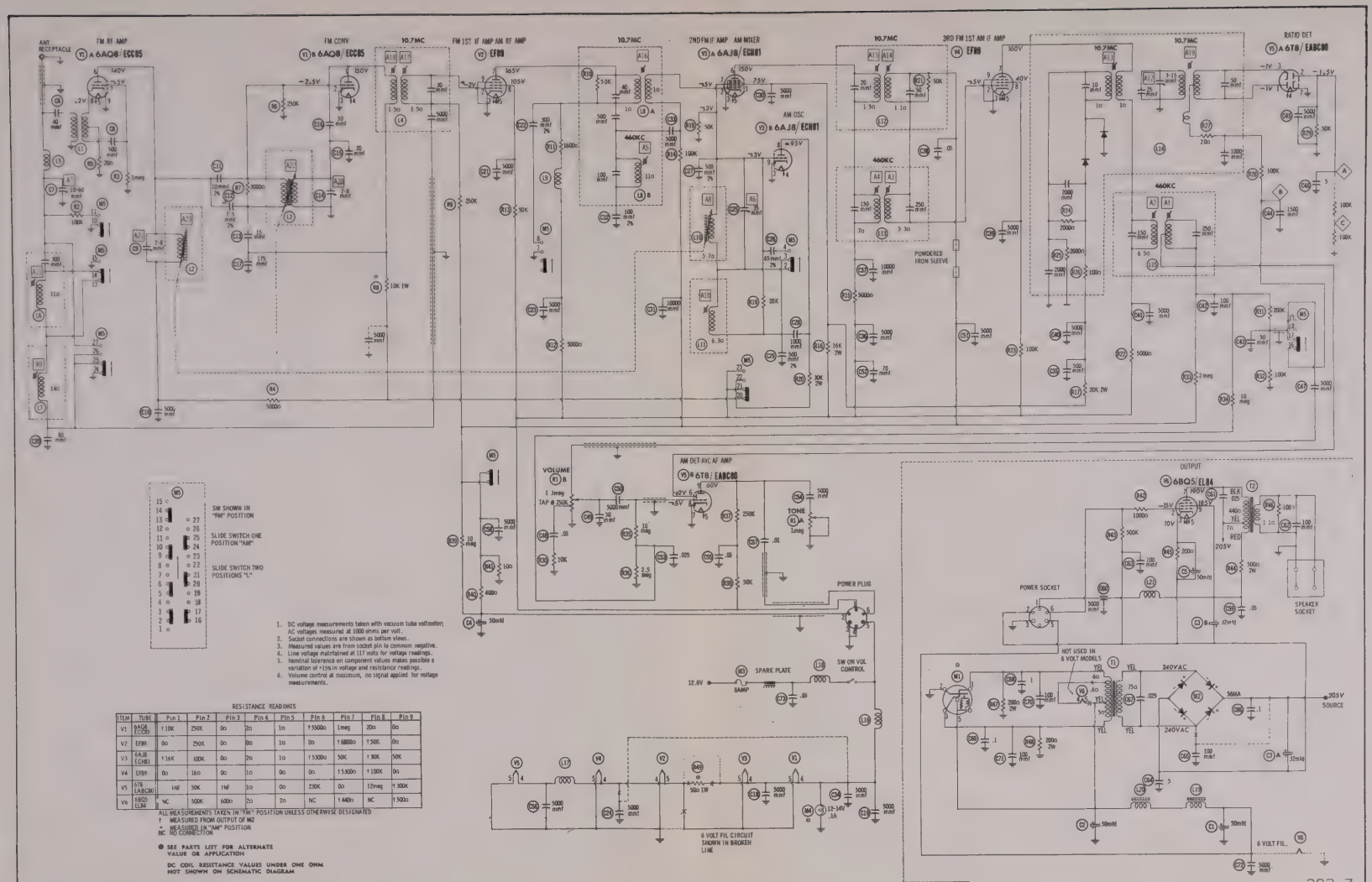
POWER SUPPLY CHASSIS-TOP VIEW



POWER SUPPLY CHASSIS-BOTTOM VIEW



CHASSIS TOP VIEW-RESISTOR AND INDUCTOR IDENT



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5. Nominal tolerance on component values makes possible a variation of ±15% in voltage and resistance readings.
6. Volume control at maximum, no signal applied for voltage measurements.

RESISTANCE READINGS

ITEM	TUBE	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Pin 9
V1	6AQ8 ECC85	†10K	250K	0Ω	2Ω	1Ω	†5500Ω	1meg	20Ω	0Ω
V2	EF89	0Ω	250K	0Ω	0Ω	1Ω	0Ω	†6800Ω	†50K	0Ω
V3	6AJ8 ECH81	†16K	100K	0Ω	2Ω	1Ω	†5300Ω	50K	†30K	50K
V4	EF89	0Ω	16Ω	0Ω	1Ω	0Ω	0Ω	†5300Ω	†100K	0Ω
V5	6T8 EABC80	INF	50K	INF	1Ω	0Ω	230K	0Ω	12meg	†300K
V6	6BQ5 EL84	* NC	500K	600Ω	2Ω	2Ω	NC	†440Ω	NC	†50Ω

ALL MEASUREMENTS TAKEN IN "FM" POSITION UNLESS OTHERWISE DESIGNATED
† MEASURED FROM OUTPUT OF M2
* MEASURED IN "AM" POSITION
NC: NO CONNECTION

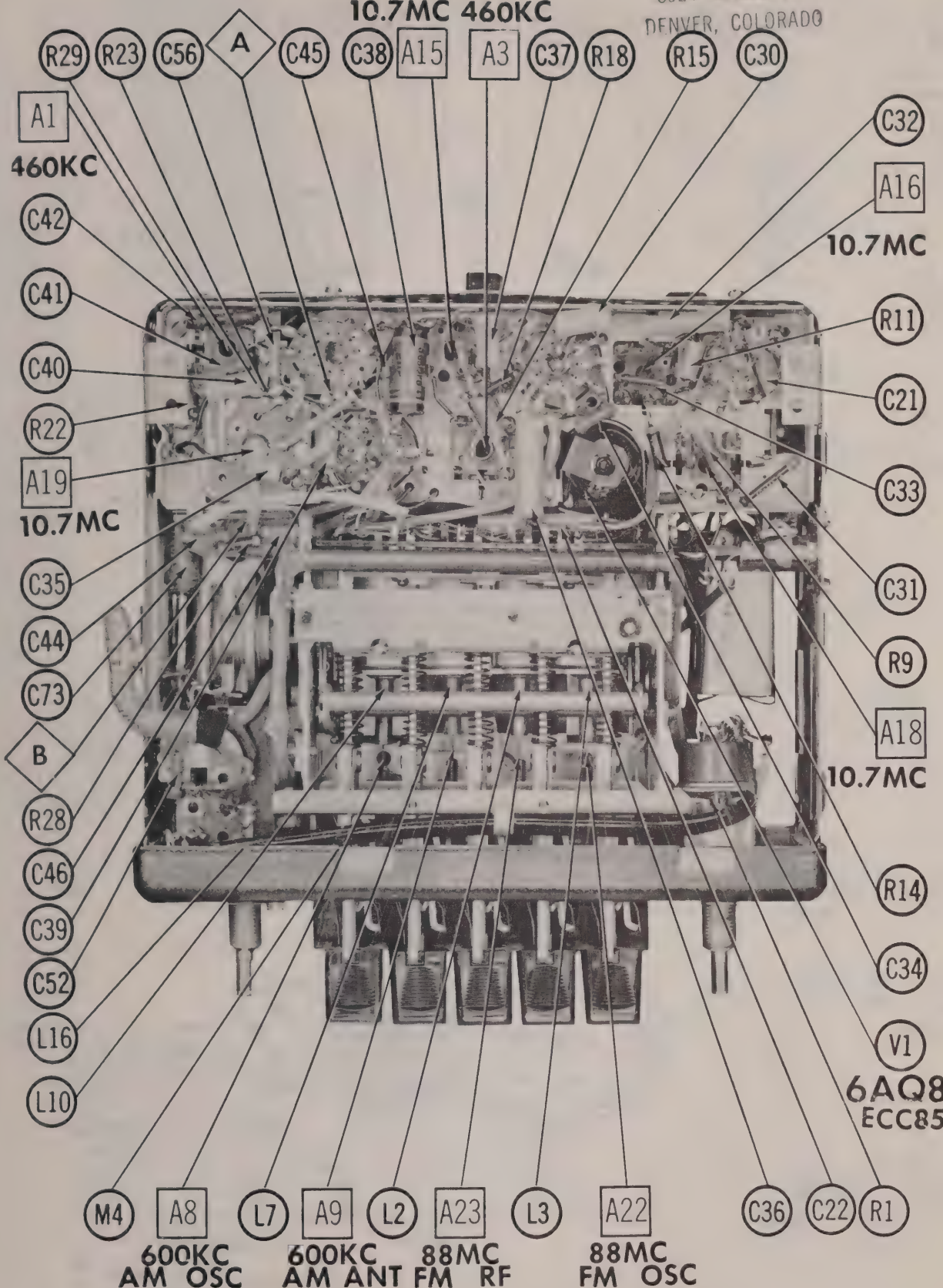
● SEE PARTS LIST FOR ALTERNATE VALUE OR APPLICATION

DC COIL RESISTANCE VALUES UNDER ONE OHM NOT SHOWN ON SCHEMATIC DIAGRAM

A PHOTOFACT STANDARD NOTATION SCHEMATIC
Howard W. Sams & Co., Inc. 1958

393-7

PROPERTY OF
L. F. BLANKENSHIP
3324 MEADE ST.
DENVER, COLORADO



CHASSIS BOTTOM VIEW

ALIGNMENT INSTRUCTIONS

AM ALIGNMENT

Volume control should be at maximum position. Output of signal generator should be no higher than necessary to obtain an output reading. Use an insulated alignment screwdriver for adjusting.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	BAND SWITCH POS.	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
1.	.05mfd	High side to pin 2 (grid) of ECH81 (V3). Low side to chassis.	460KC (400% Mod)	AM	550KC	Across Voice coil	A1, A2 A3, A4	Adjust for maximum output
2.	Fig. 1	Thru dummy to antenna receptacle.	460KC	AM	550KC	Across Voice coil.	A5	Adjust for MINIMUM output
3.	Fig. 1	Thru dummy to antenna receptacle.	1610KC	AM	Tuning gang fully open.	Across Voice coil	A6	Adjust for maximum output
4.	Fig. 1	Thru dummy to antenna receptacle.	1400KC	AM	1400KC	Across Voice coil.	A7	Adjust for maximum output
5.	Fig. 1	Thru dummy to antenna receptacle.	600KC	AM	600KC	Across Voice coil	A8, A9	Adjust for maximum output
6.	Fig. 1	Thru dummy to antenna receptacle.	200KC	LW	200KC	Across Voice coil	A10, A11	Adjust for maximum output

FM IF ALIGNMENT USING AM SIGNAL GENERATOR AND VTVM

Connect two matched 100K (± 1%) resistors in series form point (A) to chassis. The junction of these two resistors is alignment point (C) as shown on the schematic.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	BAND SWITCH POS.	RADIO DIAL SETTING	CONNECT VTVM	ADJUST	REMARKS
7.	200mmf.	High side to pin 2 (grid) of ECH81 (V3). Low side to chassis.	10.7MC (Unmod.)	FM	90MC	DC probe to point (A). Common to chassis.	A12, A13 A14, A15	Adjust for maximum deflection.
8.	Fig. 1	Thru dummy to antenna receptacle.	10.7MC	FM	90MC	DC probe to point (A) Common to chassis.	A16, A17 A18	Adjust for maximum deflection.
9.	Fig. 1	Thru dummy to antenna receptacle.	10.7MC	FM	90MC	DC probe to point B Common to point (C).	A19	Adjust for zero reading. A positive and negative reading will be obtained on either side of the correct setting.

FM IF ALIGNMENT USING FM SIGNAL GENERATOR AND OSCILLOSCOPE

Use frequency modulated signal with 60% modulation and 450KC sweep. Use 120% sawtooth voltage in scope for horizonial deflection.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	BAND SWITCH POS.	RADIO DIAL SETTING	CONNECT SCOPE	ADJUST	REMARKS
7.	200mmf	High side to pin 2 (grid) of ECH81 (V3). Low side to chassis.	10.7MC (450KC Sweep)	FM	90MC	Vert Amp to point (A). Low side to Chassis.	A12, A13 A14, A15	Adjust for curve of maximum amplitude and symmetry similar to Fig. 2
8.	Fig. 1	Thru dummy to antenna receptacle	10.7MC	FM	90MC	Vert Amp to point (A) Low side to Chassis.	A16, A17 A18	Adjust for curve of maximum amplitude and symmetry similar to Fig. 2
9.	Fig. 1	Thru dummy to antenna receptacle.	10.7MC	FM	90MC	Vert Amp to point (B) Low side to Chassis.	A19	Adjust so that 10.7MC occurs at center of crossover lines similar to Fig. 3 SLIGHTLY retouch A12 for maximum amplitude and straightness of cross-over lines.

FM RF ALIGNMENT

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	BAND SWITCH POS.	RADIO DIAL SETTING	CONNECT VTVM	ADJUST	REMARKS
10.	Fig. 1	Thru dummy to antenna receptacle	105MC (Unmod.)	FM	105MC	DC probe to point (A), Common to chassis.	A20, A21	Adjust for maximum deflection.
11.	Fig. 1	Thru dummy to antenna receptacle.	88MC	FM	88MC	DC probe to point (A). Common to chassis.	A22, A23	Adjust for maximum deflection.

With radio installed in car and antenna fully extended, tune in a weak station near 600KC and adjust A7 for maximum volume.

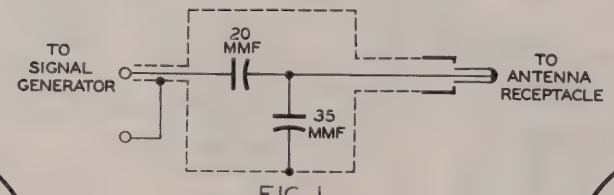


FIG. 1

FIG. 2

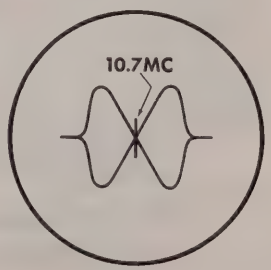


FIG. 3

PARTS LIST AND DESCRIPTIONS

TUBES (GENERAL ELECTRIC, SYLVANIA)

ITEM No.	USE	TYPE
V1	FM RF Amp. - FM Conv.	6AQ8/ ECC85
V2	1st FM IF Amp. - AM RF Amp.	EF89
V3	2nd FM IF Amp. - AM Mixer AM Oscillator	6AJ8/ ECH81
V4	3rd FM-1st AM IF Amp.	EF89
V5	Ratio Det. - AM Det. - AVC - AF Amplifier	6T8/ EABC80
V6	Output	6BQ5/ EL84

ELECTROLYTIC CAPACITORS

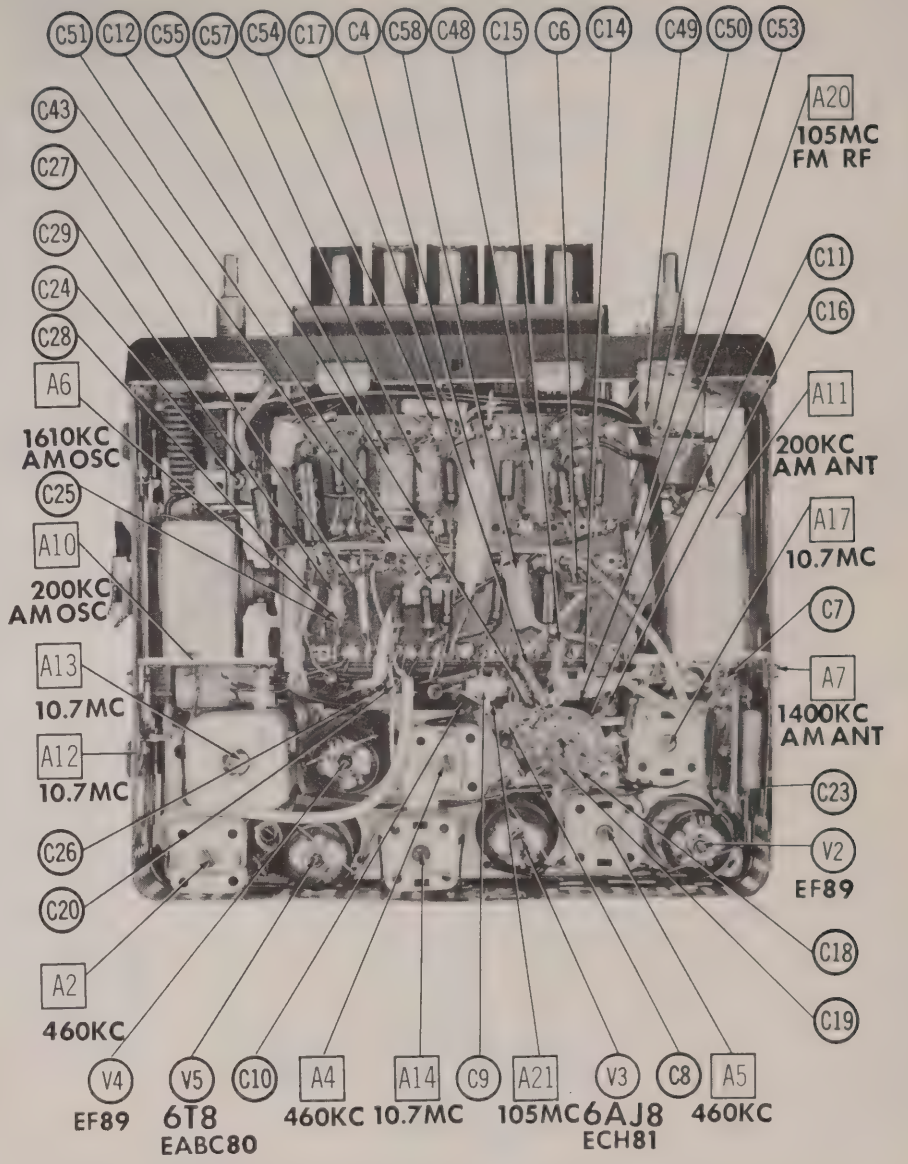
ITEM No.	RATING CAP.	RATING VOLT.	REPLACEMENT DATA BLAUPUNKT PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	PYRAMID PART No.	SANGAMO PART No.	SPRAGUE PART No.
C1	50	18		PRS25V50	BBR50-25	TC29	TD-50-25	MT-0250	TVA-1206
C2	50	18		PRS25V50	BBR50-25	TC29	TD-50-25	MT-0250	TVA-1206
C3A	32	385		PRS450V3030			TDLD-29	MTD-4530	TVA-2735
B	32	385							
C4	50	15		PRS25V50	BBR50-25	TC29	TD-50-25	MT-0250	TVA-1206
C5	50	15		PRS25V50	BBR50-25	TC29	TD-50-25	MT-0250	TVA-1206

FIXED CAPACITORS

Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING CAP.	RATING VOLT	REPLACEMENT DATA BLAUPUNKT PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ERIE PART No.	MALLORY PART No.	SPRAGUE PART No.	NOTES
C6	40									
C7	10-60									
C8	500			BPD-0005	DD-501	L10T5	ED-500	UC-535	5GA-T5	
C9	2-8									
C10	5000			SI5000	D6-502	LT6D5	GP-5000	UC-525	5GA-D5	
C11	10				TCZ-10			MCE215		2%
C12	7.5									① 2%
C13	15			SI15	D6-150	LT6Q15	GP-15	UC-5415	5GA-Q15	
C14	2-8									
C15	20			SI20	D6-200	LT6Q2	GP-20	UC-542	5GA-Q2	
C16	30			SI30	DD-300	LT6Q3	GP-30	UC-543	5GA-Q3	
C17	175									
C18	5000			SI5000	D6-502	LT6D5	GP-5000	UC-525	5GA-D5	
C19	5000			SI5000	D6-502	LT6D5	GP-5000	UC-525	5GA-D5	
C20	80									
C21	5000			SI5000	D6-502	LT6D5	GP-5000	UC-525	5GA-D5	
C22	300							MCE241		2%
C23	5000			SI5000	D6-502	LT6D5	GP-5000	UC-525	5GA-D5	
C24	5000			SI5000	D6-502	LT6D5	GP-5000	UC-525	5GA-D5	
C25	35									
C26	65									2%
C27	500							MCE245		2%
C28	1000			SI1000	D6-102	LT6D1	GP-1000	UC-521	5GA-D1	
C29	500							MCE245		2%
C30	5000			SI5000	D6-502	LT6D5	GP-5000	UC-525	5GA-D5	
C31	10000			SI10000	D6-103	LT6S1	GP-10000	DC511	5HK-S1	
C32	100				TCZ-100			MCE235		2%
C33	5000			SI5000	D6-502	LT6D5	GP-5000	UC-525	5GA-D5	
C34	5000			SI5000	D6-502	LT6D5	GP-5000	UC-525	5GA-D5	
C35	500			BPD-0005	DD-501	L10T5	ED-500	UC-535	5GA-T5	
C36	5000			SI5000	D6-502	LT6D5	GP-5000	UC-525	5GA-D5	
C37	10000			SI10000	D6-103	LT6S1	GP-10000	DC511	5HK-S1	
C38	.05	250		P488N-05	DF-503	CUB4S5		GEM-415	4TM-S5	
C39	5000			SI5000	D6-502	LT6D5	GP-5000	UC-525	5GA-D5	
C40	5000			SI5000	D6-502	LT6D5	GP-5000	UC-525	5GA-D5	
C41	5000			SI5000	D6-502	LT6D5	GP-5000	UC-525	5GA-D5	
C42	100			SI100	D6-101	LT6T1	GP-100	UC-531	5GA-T1	
C43	50			SI50	D6-500	LT6Q5	GP-50	UC-545	5GA-Q5	
C44	1500			SI1500	D6-152	LT6D15	GP-1500	UC-5215	5GA-D15	
C45	5000			SI5000	D6-502	LT6D5	GP-5000	UC-525	5GA-D5	
C46	.5	250		P488N-5		CUB4P5		GEM-405	4TM-P5	
C47	5000			SI5000	D6-502	LT6D5	GP-5000	UC-525	5GA-D5	
C48	.05	250		P488N-05	DF-503	CUB4S5		GEM-415	4TM-S5	
C49	50			SI50	D6-500	LT6Q5	GP-50	UC-545	5GA-Q5	
C50	5000			SI5000	D6-502	LT6D5	GP-5000	UC-525	5GA-D5	
C51	5000			SI5000	D6-502	LT6D5	GP-5000	UC-525	5GA-D5	
C52	70									
C53	.025	250		P488N-025		CUB4S22		GEM-4122	4TM-S22	
C54	5000			SI5000	D6-502	LT6D5	GP-5000	UC-525	5GA-D5	
C55	.05	250		P488N-05	DF-503	CUB4S5		GEM-415	4TM-S5	

CHASSIS—TOP VIEW



PARTS LIST AND DESCRIPTIONS (Continued)

CAPACITORS (cont)

ITEM No.	RATING CAP.	RATING VOLT	BLAUPUNKT PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ERIE PART No.	MALLORY PART No.	SPRAGUE PART No.	NOTES
C56	5000			SI5000	D6-502	LT6D5	GP-5000	UC-525	5GA-D5	
C57	.01	250		P488N-01	D6-103	CUB4S1	GP-10000	GEM-411	4TM-S1	
C58	5000			SI5000	D6-502	LT6D5	GP-5000	UC-525	5GA-D5	
C59	.05	500		P688N-05	DF-503	CUB6S5		GEM-615	6TM-S5	
C60	5000									
C61	.025	500		P688N-025		CUB6S22		GEM-6122	6TM-S22	
C62	100			SI100	D6-101	LT6T1	GP-100	UC-531	5GA-T1	
C63	100			SI100	D6-101	LT6T1	GP-100	UC-531	5GA-T1	
C64	.5	500		P688N-5		CUB6P5		GEM-605	6TM-P5	
C65	100			SI100	D6-101	LT6T1	GP-100	UC-531	5GA-T1	
C66	.1	500		P688N-1	DF-104	CUB6P1		GEM-601	6TM-P1	
C67	.025	500		P688N-025		CUB6S22		GEM-6122	6TM-S22	
C68	.1	500		P688N-1	DF-104	CUB6P1		GEM-601	6TM-P1	
C69	.1	500		P688N-1	DF-104	CUB6P1		GEM-601	6TM-P1	
C70	100			SI100	D6-101	LT6T1	GP-100	UC-531	5GA-T1	
C71	100			SI100	D6-101	LT6T1	GP-100	UC-531	5GA-T1	
C72	5000			SI5000	D6-502	LT6D5	GP-5000	UC-525	5GA-D5	
C73	.05	250		P488N-05	DF-503	CUB4S5		GEM-415	4TM-S5	

①Some version use 10mmf in this application.

CONTROLS

ITEM No.	RATING RESISTANCE	RATING WATTS	BLAUPUNKT PART No.	CENTRALAB PART No.	CLAROSTAT PART No.	IRC PART No.	MALLORY PART No.	INSTALLATION NOTES
R1A B C	1meg 1.3meg Switch	½ ½						Tone Volume, Tap@250K

RESISTORS

All wattages 1/2 watt, or less, unless otherwise listed.

ITEM No.	RATING OHMS	RATING WATT	BLAUPUNKT PART No.	NOTES
R2	100K			
R3	1meg			
R4	5000Ω			
R5	20Ω			
R6	250K			
R7	3000Ω			
R8	10K	1		Note 1
R9	250K			
R10	50K			
R11	1600Ω			
R12	5000Ω			
R13	50K			
R14	100K			
R15	5000Ω			
R16	16K	2		
R17	20K	2		
R18	50K			
R19	20K			
R20	30K	2		
R21	50K			
R22	5000Ω			
R23	100K			
R24	2000Ω			
R25	2000Ω			

ITEM No.	RATING OHMS	RATING WATT	BLAUPUNKT PART No.	NOTES
R26	100Ω			
R27	20Ω			
R28	100K			
R29	50K			
R30	10K			
R31	200K			
R32	100K			
R33	2meg			
R34	10meg			
R35	10meg			
R36	2.5meg			
R37	250K			
R38	50K			
R39	10meg			
R40	400Ω			
R41	10Ω			
R42	1000Ω			
R43	500K			
R44	500Ω	2		
R45	200Ω			
R46	100Ω			
R47	200Ω	2		
R48	200Ω	2		
R49	50Ω	1		Note 2

Note 1. Some versions may use 30K in this application.
Note 2. Not used in 6 Volt version.

TRANSFORMER (VIBRATOR)

ITEM No.	RATING PRI.	RATING SEC. 1	RATING SEC. 2	RATING SEC. 3	BLAUPUNKT PART No.	Halldorson PART No.	Merit PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.
T1	12.6V @ 3.4A Tap @ 6V@1.9A	240V @.056A			TF722/4					

PARTS LIST AND DESCRIPTIONS (Continued)

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	TURNS RATIO PRI.	TURNS RATIO SEC.	BLAUPUNKT PART No.	Halldorson PART No.	Merit PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.	NOTES
T2	30:	1	TF27/54						

COILS (RF-IF)

ITEM No.	USE	BLAUPUNKT PART No.	Meissner PART No.	Merit PART No.	Miller PART No.	Ram PART No.	NOTES
L1	FM Ant. Coil						
L2	FM RF Coil						
L3	FM Osc. Coil						
L4	1st FM IF						
L5	AM Ant. Coil						
L6	AM Ant. Coil						
L7	AM Ant. Coil						
L8A	2nd FM IF						
B	IF Trap						460KC
L9	RF Choke						
L10	AM Osc. Coil						
L11	AM Osc. Coil						
L12	3rd FM IF						
L13	1st AM IF		16-6765				
L14	Ratio Det.						
L15	2nd AM IF						
L16	Filament Choke						
L17	Filament Choke						
L18	"A" Lead Choke						
L19	Hash Choke						
L20	Hash Choke						
L21	RF Choke						

VIBRATOR

ITEM No.	TYPE	INPUT VOLTS	FREQUENCY	BLAUPUNKT PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	RADIART PART No.	NOTES
M1	Interrupter	12.6V	115v	1 844/5Z				Used in 12 volt versions
	Interrupter	6.3V	115v	1 844/6Z				Used in 6 volt versions

RECTIFIERS

ITEM No.	RATING CURRENT (Measured)	BLAUPUNKT PART No.	FEDERAL PART No.	INTERNATIONAL PART No.	SARKES TARZIAN PART No.	NOTES
M2	.056A	B250C125				

FUSES

ITEM No.	TYPE	RATING	BLAUPUNKT PART No. FUSE	BLAUPUNKT PART No. HOLDER	LITTELFUSE PART No. FUSE	LITTELFUSE PART No. HOLDER	BUSS PART No. FUSE	BUSS PART No. HOLDER
M3		8A						

MISCELLANEOUS

ITEM No.	PART NAME	BLAUPUNKT PART No.	NOTES
M4	Dial Lamp		12-14V .1A (12Volt Versions)
	Dial Lamp		6-8V .1A (6Volt Versions)
M5	Switch		Station Selector and Function Selector

WIRING DATA

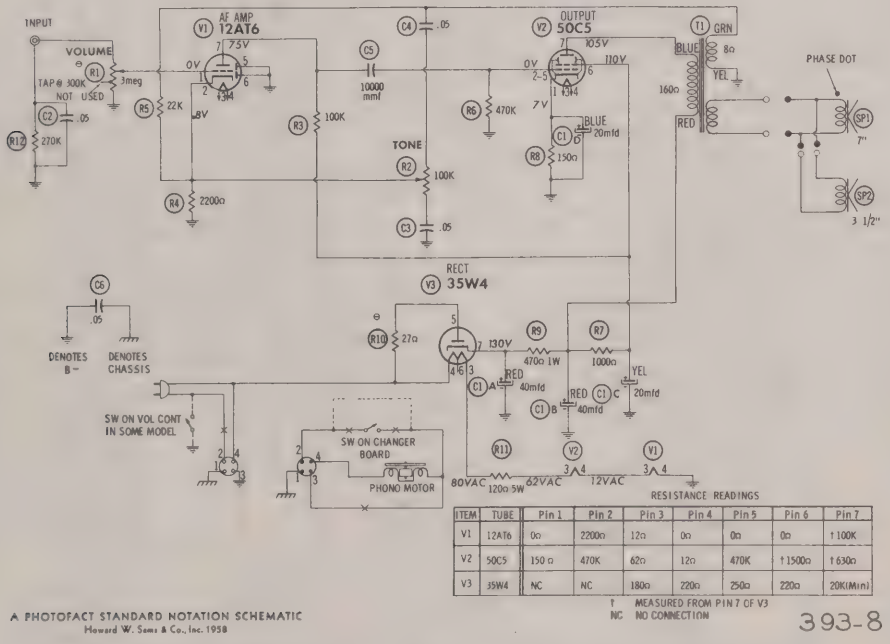
General-use Shielded Hook-up Wire ..... Use BELDEN No. 8530 (Solid) Available in Ten Colors
8524 (Stranded) Available in Ten Colors
Shielded Hook-up Wire ..... Use BELDEN No. 8885
Bonding Strap ..... Use BELDEN No. 8661

PROPERTY OF
L. F. BLANKENSHIP
3924 MEADE ST.
DENVER, COLORADO

FIRESTONE
MODEL 4-A-174

TRADE NAME	Firestone Model 4-A-174 (Code 364-7-265)
SUPPLIER	Firestone Tire & Rubber Co., 1200 Firestone Parkway, Akron, Ohio
TYPE SET	AC Operated Phono Amplifier With 4 Speed Automatic Record Changer
TUBES (Three)	Types 12AT6 AF Amplifier, 50C5 Output, 35W4 Rectifier
POWER SUPPLY	110-120 Volts AC-60 Cycles RATING .26 Amp. @ 117 Volts AC (25 Watts Without Motor)

FOR SERVICE INFORMATION ON RECORD CHANGER — SEE SIMILAR V-M MODEL 1200A — PHOTOFACT SET 353 FOLDER 16



RESISTANCE READINGS

ITEM	TUBE	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7
V1	12AT6	0Ω	2200Ω	12Ω	0Ω	0Ω	0Ω	†100K
V2	50C5	150Ω	470K	62Ω	12Ω	470K	†1500Ω	†630Ω
V3	35W4	NC	NC	180Ω	220Ω	250Ω	220Ω	20K(Min)

† MEASURED FROM PIN 7 OF V3
NC NO CONNECTION

A PHOTOFACT STANDARD NOTATION SCHEMATIC
Howard W. Sams & Co., Inc. 1958

393-8

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PARTS LIST AND DESCRIPTIONS

TUBES (GENERAL ELECTRIC, SYLVANIA)

ITEM No.	USE	TYPE	NOTES
V1	AF Amplifier	12AT6	
V2	Output	50C5	
V3	Rectifier	35W4	

ELECTROLYTIC CAPACITORS

ITEM No.	RATING CAP.	RATING VOLT.	REPLACEMENT DATA FIRESTONE PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	PYRAMID PART No.	SANGAMO PART No.	SPRAGUE PART No.
C1A	40	150	1019		BBRQ44315C	WQ230		FMT-312	R2527 *
B	40	150						MMT-0220	
C	20	150							
D	20	25							

* Non Catalog Item

FIXED CAPACITORS

Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING CAP.	RATING VOLT	REPLACEMENT DATA FIRESTONE PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ERIE PART No.	MALLORY PART No.	SPRAGUE PART No.	NOTES
C2	.05	400		P488N-05	DF-503	CUB4S5		GEM-415	4TM-S5	
C3	.05	200		P288N-05	DF-503	CUB2S5		GEM-415	2TM-S5	
C4	.05	200		P288N-05	DF-503	CUB2S5		GEM-415	2TM-S5	
C5	10000			BPD-01	DD-103	BYA6S1	ED-01	DC511	5HK-S1	
C6	.05	400		P488N-05	DF-503	CUB4S5		GEM-415	4TM-S5	

CONTROLS

ITEM No.	RATING RESISTANCE	RATING WATTS	REPLACEMENT DATA FIRESTONE PART No.	CENTRALAB PART No.	CLAROSTAT PART No.	IRC PART No.	MALLORY PART No.	INSTALLATION NOTES
R1A	3meg	½	401E	BT-8517	A47F3-3meg	Q13-140	U57	Volume, Tap ② 300K ①
B	Shaft			Not Req.	KSS-3	Not Req.	Not Req.	
R2A	100K	½	416	B-40	A47-100K-S	Q11-128	U41	Tone
B	Shaft			Not Req.	KSS-3	Not Req.	Not Req.	

① Tap not used

RESISTORS

All wattages 1/2 watt, or less, unless otherwise listed.

ITEM No.	RATING OHMS	RATING WATT	FIRESTONE PART No.	NOTES
R3	100K			
R4	2200Ω			
R5	22K			
R6	470K			
R7	1000Ω			
R8	150Ω			
R9	470Ω	1		
R10	27Ω		542	Fuse Type
R11	120Ω	5	625	
R12	270K			

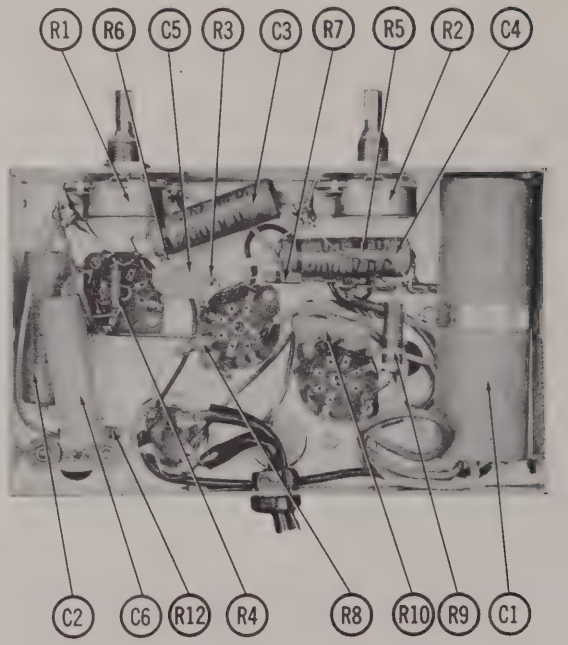
TRANSFORMER (AUDIO OUTPUT)

ITEM No.	IMPEDANCE PRI.	IMPEDANCE SEC.1	REPLACEMENT DATA FIRESTONE PART No.	Halldorson PART No.	Merit PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.	NOTES
T1	2400Ω	3-4Ω	1209C						
	Turns Ratio PRI.	SEC.2							
	5:	1							

SPEAKER

ITEM No.	TYPE SIZE	TYPE FIELD	TYPE V. C. IMP.	REPLACEMENT DATA FIRESTONE PART No.	REPLACEMENT DATA QUAM PART No.	NOTES
SP1	7"	PM	3-4Ω	2629 ①	7A21 ①	① Parallel and phase
SP2	3½"	PM	16Ω	2633 ①	3A5TZ16 ①	

CHASSIS—BOTTOM VIEW



PHONO CARTRIDGE

ITEM No.	REPLACEMENT DATA FIRESTONE PART No.	ASTATIC PART No. CARTRIDGE	ASTATIC PART No. NEEDLE	ELECTRO-VOICE PART No. CARTRIDGE	ELECTRO-VOICE PART No. MOUNT	REMARKS
M1	2589	81-TB		56	*PT-2	* Not required unless original mounting mechanism is damaged.

PHONO NEEDLE

(FOR REPLACEMENT IN ORIGINAL EQUIPMENT CARTRIDGE)

ITEM No.	REPLACEMENT DATA FIRESTONE PART No.	JENSEN PART No.	WALCO PART No.	REMARKS
M2				

CABINETS & CABINET PARTS

(When Ordering Cabinets & Cabinet Parts, Specify Model, Chassis & Color)

NAME	PART NO.	DESCRIPTION
Knob	2430B	Tone
Knob	2430C	Volume

WIRING DATA

General-use Unshielded Hook-up Wire ..... Use BELDEN No. 8530 (Solid) Available in Ten Colors
8524 (Stranded) Available in Ten Colors

Power Cord ..... Use BELDEN No. 1765-B (6 Ft. Length)
1725-K (7½ Ft. Length)

Low-Loss Shielded Lead (Interconnecting)..... Use BELDEN No. 8401

Phono Pick-up Arm Cable ..... Use BELDEN No. 8430 (Two Conductor - Twisted)

PHOTOFACT* Folder

*TRADE MARK

EIA MEMBER ELECTRONIC INDUSTRIES ASSOCIATION

MADISON FIELDING MODEL FM-15

MADISON FIELDING
MODEL FM-15

PROPERTY OF
L. F. BLANKENSHIP
3924 MEADE ST.
DENVER, COLORADO

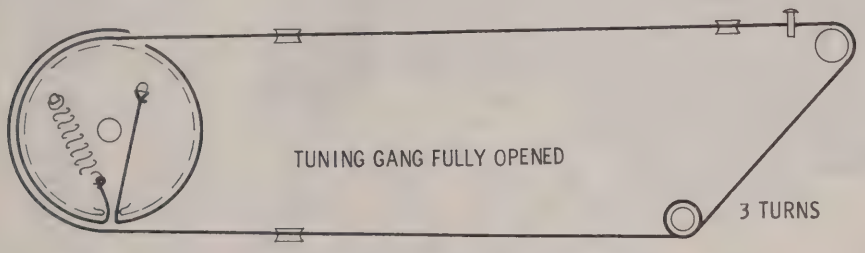
MADISON FIELDING
MODEL FM-15

TRADE NAME	Madison Fielding Model FM-15
MANUFACTURER	Madison Fielding Corp., 863 Madison Street, Brooklyn 21, N. Y.
TYPE SET	AC Operated FM Tuner
TUBES (Eight)	Types 6AQ8/ECC85 RF Amp. - Conv., 6AU6 1st IF Amplifier, 6AU6 2nd IF Amplifier, 6AU6 3rd IF Amp., 6AL5 Ratio Detector, 6C4 Cathode Follower, DM70 Tuning Indicator, 6X4 Rectifier
POWER SUPPLY	105-125 Volts AC-50/60 Cycles — RATING .31 Amp. @ 117 Volts AC (30 Watts)
TUNING RANGE—FREQ. MOD.	88-108MC

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

Volume control should be at maximum position. Output of signal generator should be no higher than necessary to obtain an output reading. Use an insulated alignment screwdriver for adjusting.
To set dial, tune to high frequency end of dial. Loosen set screw on tuning indicator carriage. Perform alignment step 3. Hold dial cord motionless and set tuning indicator directly behind 108MC mark on dial. Tighten set screw on top of carriage. Perform step 4.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	RADIO DIAL SETTING	CONNECT VTVM	ADJUST	REMARKS
1.	Direct	High side to ungrounded tube shield on ECC85 (V1). Low side to chassis.	10.7MC (Unmod)	Point of non-interference	DC probe to point (A). Common to chassis.	A1, A2, A3, A4, A5, A6, A7	Adjust for maximum deflection.
2.	"	"	"	"	Zero center DC probe to point (B). Common to chassis.	A8	Adjust for zero reading. A positive and negative reading will be obtained on either side of the correct setting. Repeat steps 1 and 2 until no further improvement is noted.
3.	300Ω Carbon Resistor	Across antenna terminals with 300Ω in high side	108MC (250KC Swp)	108MC	DC probe to point (A). Common to chassis.	A9	Adjust for maximum deflection.
4.	"	"	91MC (22.5KC Swp)	91MC	"	A10	Adjust for maximum deflection. Repeat steps 3 and 4 until no further improvement is noted.



DIAL CORD STRINGING

HOWARD W. SAMS & CO., INC. • Indianapolis 5, Indiana

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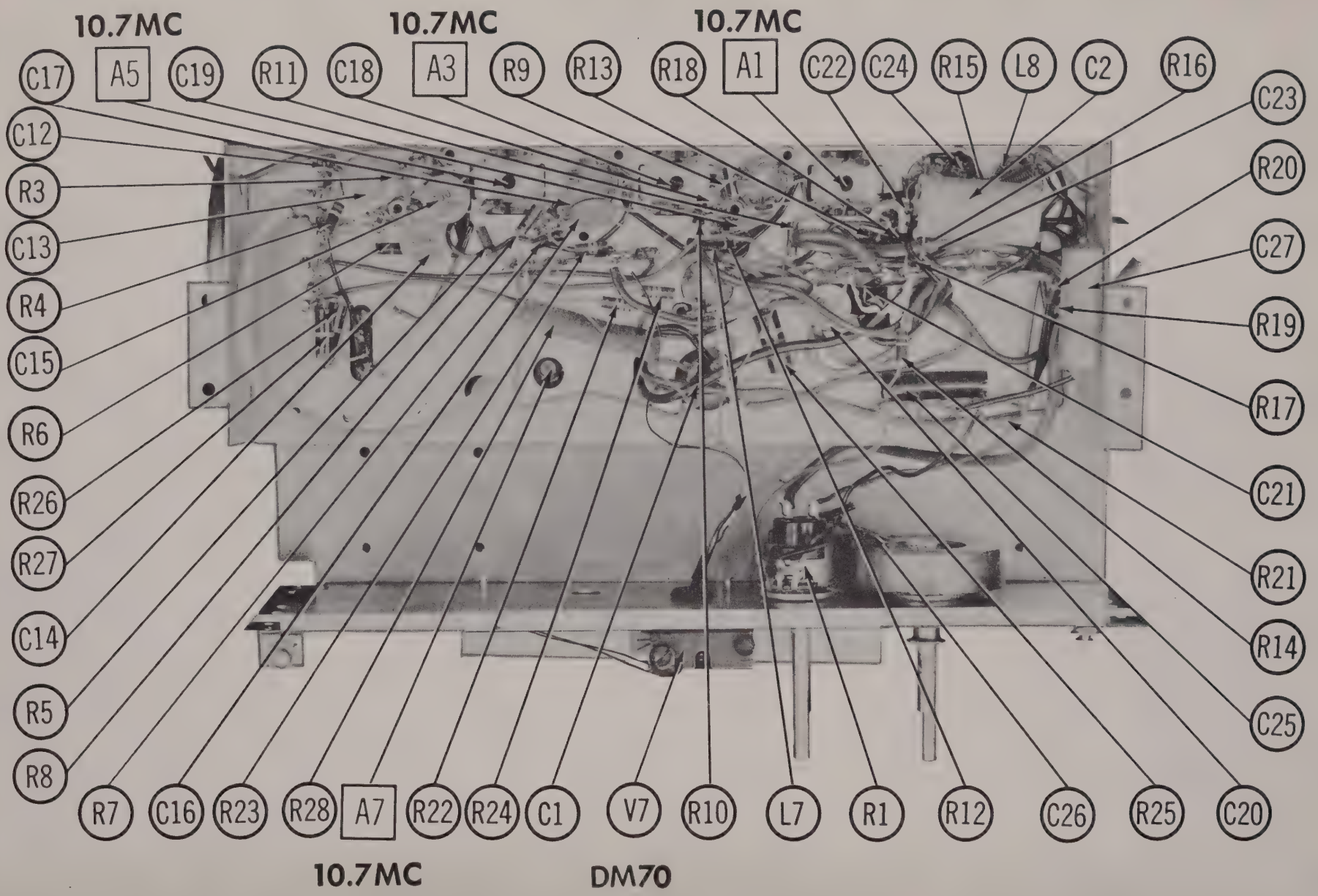


CHASSIS BOTTOM VIEW

PARTS LIST AND DESCRIPTIONS

TUBES (GENERAL ELECTRIC, SYLVANIA)

ITEM No.	USE	TYPE
V1	RF Amp. - Conv	6AQ8/ECC85
V2	1st IF Amplifier	6AU6
V3	2nd IF Amplifier	6AU6
V4	3rd IF Amplifier	6AU6

ITEM No.	USE	TYPE
V5	Ratio Detector	6AL5
V6	Cathode Follower	6C4
V7	Tuning Indicator	DM70
V8	Rectifier	6X4

ELECTROLYTIC CAPACITORS

ITEM No.	RATING CAP.	RATING VOLT.	REPLACEMENT DATA Madison Fielding PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	PYRAMID PART No.	SANGAMO PART No.	SPRAGUE PART No.
C1A	■30	300	CE402010	AFH3-116	C1220	FP330. 7	TMT-86	T-425	TVL-3639. 8
B	▲20	250							
C	10	150							
C2	8	50		PRS150V8	BBR8-150	TC41	TD-8-150	MT-1508	TVA-1405

FIXED CAPACITORS

Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING CAP.	RATING VOLT	REPLACEMENT DATA Madison Fielding PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ERIE PART No.	MALLORY PART No.	SPRAGUE PART No.	NOTES
C3	10			SI 10	D6-100	LT6Q1	GP-10	UC-541	5GA-Q1	
C4	1000			SI 1000	D6-102	LT6D1	GP-1000	UC-521	5GA-D1	
C5	1000			SI 1000	D6-102	LT6D1	GP-1000	UC-521	5GA-D1	
C6	20			SI 20	D6-200	LT6Q2	GP-20	UC-542	5GA-Q2	
C7	20			SI 20	D6-200	LT6Q2	GP-20	UC-542	5GA-Q2	
C8	8. 2			NPO-SI 8. 2		C10V82C	TCO-8. 2			
C9	68			SI 68	D6-680	LT6Q68	GP-68	UC-5468	5GA-Q68	
C10	10			SI 10	D6-100	LT6Q1	GP-10	UC-541	5GA-Q1	
C11	15			SI 15	D6-150	LT6Q15	GP-15	UC-5415	5GA-Q15	
C12	220									N75
C13	5000			BPD-005	DD-502	BYA10D5	ED-005	DC525	5GA-D5	
C14	5000			BPD-005	DD-502	BYA10D5	ED-005	DC525	5GA-D5	
C15	5000			BPD-005	DD-502	BYA10D5	ED-005	DC525	5HK-D5	①
C16	5000			BPD-005	DD-502	BYA10D5	ED-005	DC525	5GA-D5	
C17	5000			BPD-005	DD-502	BYA10D5	ED-005	DC525	5GA-D5	
C18	100			SI 100	D6-101	LT6D1	GP-100	UC-531	5GA-T1	
C19	5000			BPD-005	DD-502	BYA10D5	ED-005	DC525	5GA-D5	
C20	5000			BPD-005	DD-502	BYA10D5	ED-005	DC525	5GA-D5	
C21	300			SI 300	D6-301	LT6T3	GP-300	UC-533	5GA-T3	
C22	300			SI 300	D6-301	LT6T3	GP-300	UC-533	5GA-T3	
C23	300			SI 300	D6-301	LT6T3	GP-300	UC-533	5GA-T3	
C24	5000			BPD-005	DD-502	BYA10D5	ED-005	DC525	5GA-D5	
C25	1500			BPD-0015	DD-152	BYA10D15	ED-1500	DC5215	5GA-D15	
C26	20000			BPD-02	DD-203	BYB6S2	ED-02		5HK-S2	
C27	.1	100		P288N-1	DF-104	CUB2P1		GEM-201	2TM-P1	

① Not used in some versions.

CONTROLS

ITEM No.	RATING RESISTANCE	RATING WATTS	REPLACEMENT DATA Madison Fielding PART No.	CENTRALAB PART No.	CLAROSTAT PART No.	IRC PART No.	MALLORY PART No.	INSTALLATION NOTES
R1A	100K	½	RV-1041	B-41	A47-100K-S		PP15A	Level
B	Shaft			Not Req.	FS-3			
C	Switch			KB-1	SWE-12			

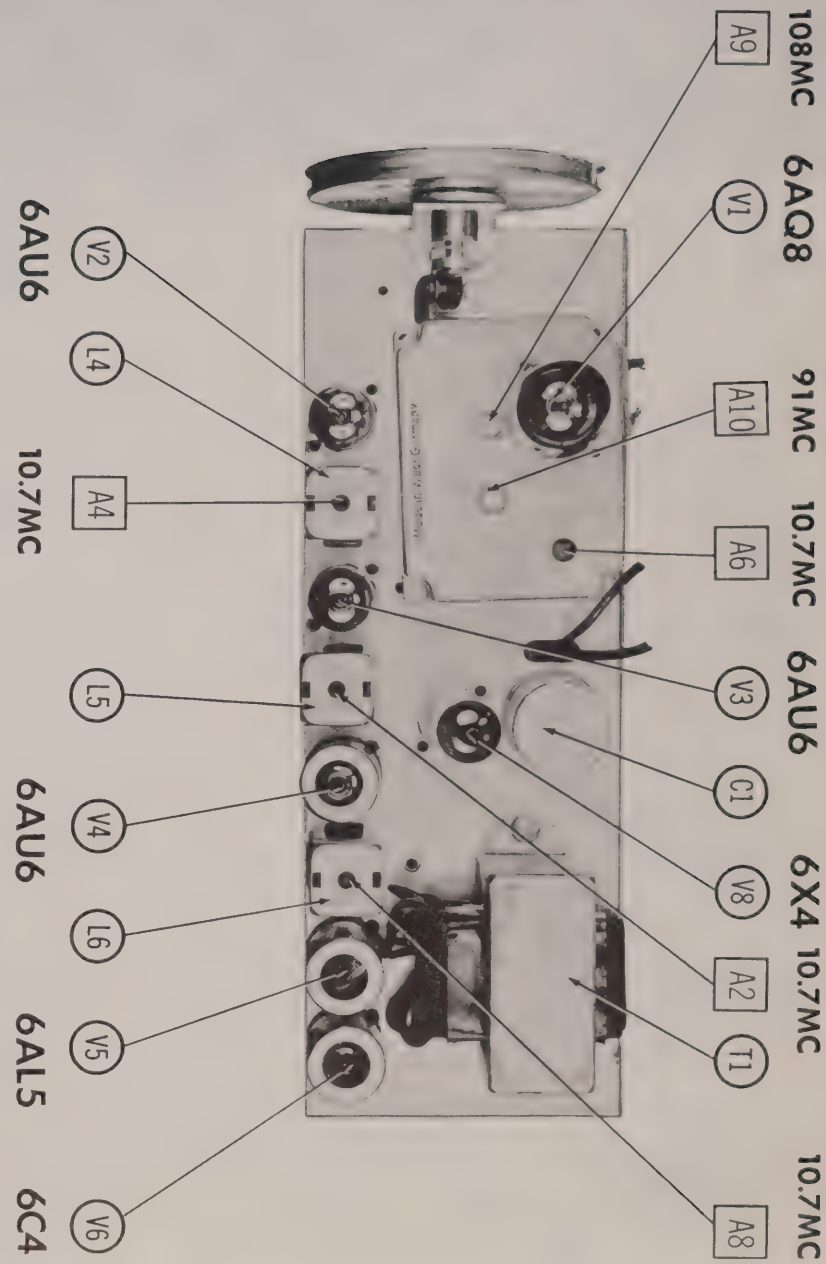
RESISTORS

All wattages 1/2 watt, or less, unless otherwise listed.

ITEM No.	RATING OHMS	RATING WATT	Madison Fielding PART No.	NOTES
R2	1meg			
R3	470K			
R4	470K			
R5	1000Ω			
R6	100Ω			

ITEM No.	RATING OHMS	RATING WATT	Madison Fielding PART No.	NOTES
R7	1000Ω			
R8	100Ω			
R9	100K			
R10	470K			
R11	1000Ω			

CHASSIS—TOP VIEW



PARTS LIST AND DESCRIPTIONS (Continued)

RESISTORS (cont)

ITEM No.	RATING OHMS	RATING WATT	Madison Fielding PART No.	NOTES
R12	100Ω			
R13	68Ω			
R14	68K			
R15	1500Ω			
R16	6800Ω			
R17	1000Ω			
R18	6800Ω			
R19	2.2meg			
R20	2200Ω			

ITEM No.	RATING OHMS	RATING WATT	Madison Fielding PART No.	NOTES
R21	47K			
R22	330K			
R23	270K			
R24	270K			
R25	560Ω	2		
R26	10K	1		
R27	10K	1		
R28	3300Ω	5		

TRANSFORMER (POWER)

ITEM No.	RATING PRI.	RATING SEC. 1	RATING SEC. 2	RATING SEC. 3	REPLACEMENT DATA Madison Fielding PART No.	Halldorson PART No.	Merit PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.
T1	117V @ .31A	460VCT @ .030A	6.3V @ 2A	1.5V @ .025A	TP-1002					

COILS (RF-IF)

ITEM No.	USE	REPLACEMENT DATA Madison Fielding PART No.	Meissner PART No.	Merit PART No.	Miller PART No.	Ram PART No.	NOTES
L1	Ant. Trans.						Note 1
L2A	RF Coil						Note 1
B	Osc. Coil						Note 1
L3	1st IF Trans.						Note 1
L4	2nd IF Trans.	TI-1001	16-3487	FM-254	1463		
L5	3rd IF Trans.	TI-1001	16-3487	FM-254	1463		
L6	Ratio Det.	TI-1002	17-3498	FM-255	1465		
L7	Fil. Choke	LC-1001	19-1000	BC-561	4602		.9 Microhenry
L8	Fil. Choke	LC-1001	19-1000	BC-561	4602		.9 Microhenry

Note 1. Part of Tuner Assembly M3

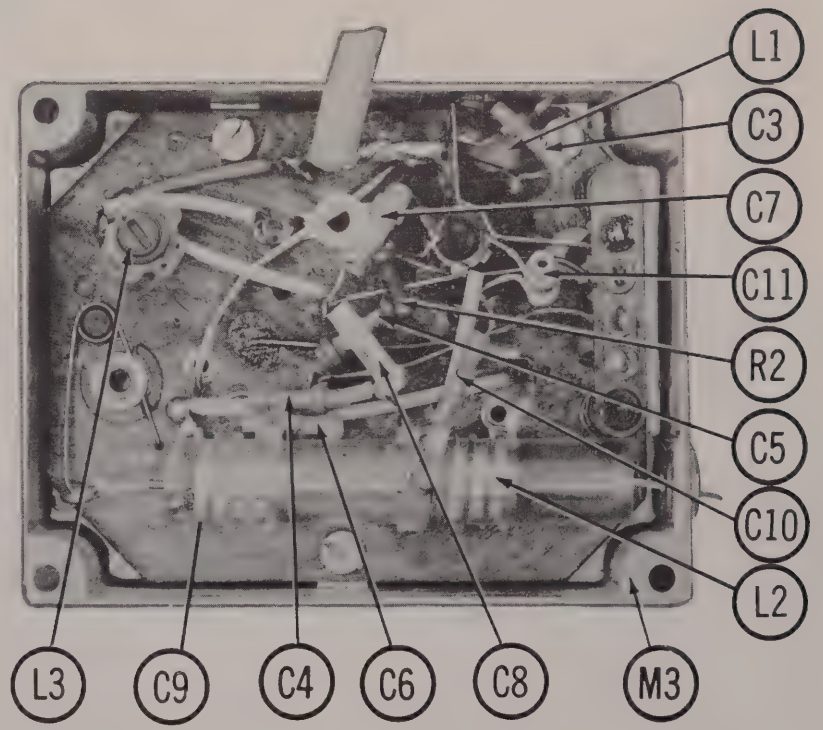
MISCELLANEOUS

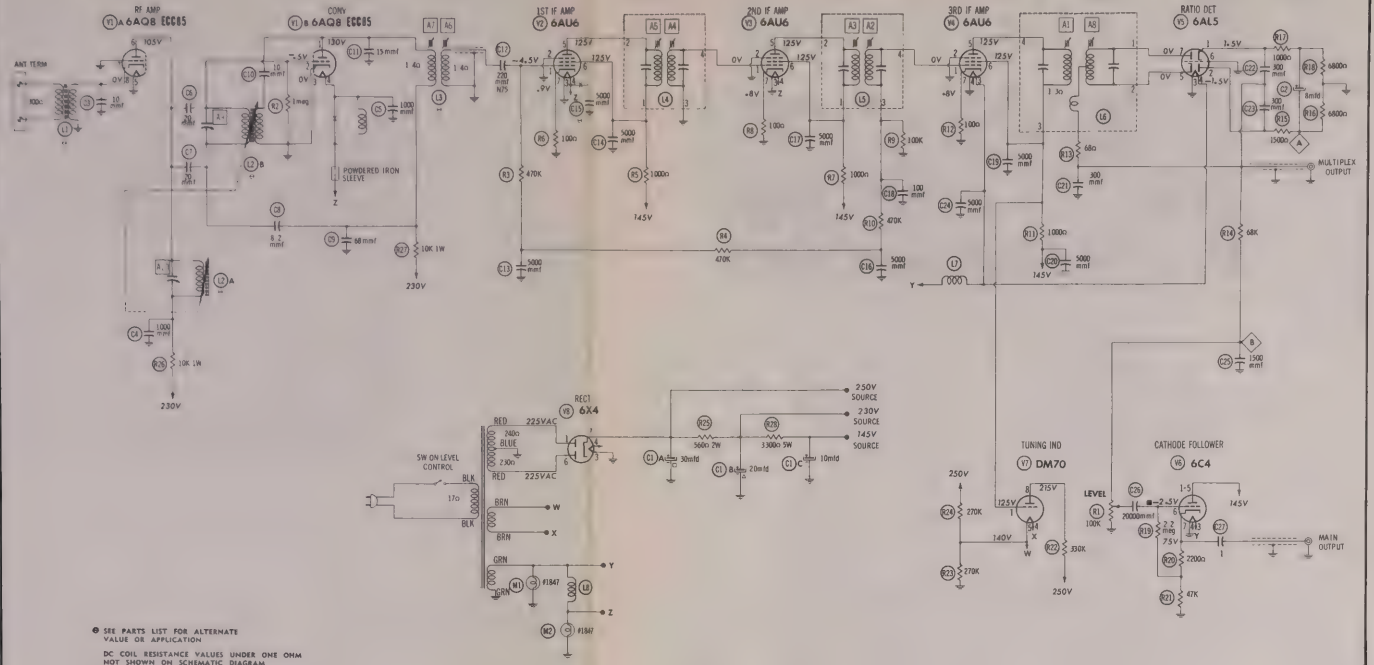
ITEM No.	PART NAME	Madison Fielding PART No.	NOTES
M1	Pilot Lamp		#1847
M2	Pilot Lamp		#1847
M3	Tuner Assembly	AS-1001	

WIRING DATA

General-use Unshielded Hook-up Wire ..... Use BELDEN No. 8530 (Solid) Available in Ten Colors
8524 (Stranded) Available in Ten Colors
Power Cord ..... Use BELDEN No. 1765-B (6 Ft. Length)
1725-K (7½ Ft. Length)
Low-Loss Shielded Lead (Interconnecting)..... Use BELDEN No. 8401
Phono Pick-up Arm Cable ..... Use BELDEN No. 8430 (Two Conductor - Twisted)

RF-SUB CHASSIS





● SEE PARTS LIST FOR ALTERNATE VALUE OR APPLICATION

DC COIL RESISTANCE VALUES UNDER ONE OHM NOT SHOWN ON SCHEMATIC DIAGRAM

1. DC voltage measurements taken with vacuum tube voltmeter, AC voltages measured at 1000 ohms per volt.
2. Socket connections are shown as bottom views
3. Measured values are from socket pin to common negative
4. Line voltage maintained at 117 volts for voltage readings
5. Nominal tolerance on component values makes possible a variation of ±15% in voltage and resistance readings
6. Volume control at maximum, no signal applied for voltage measurements

RESISTANCE READINGS

ITEM	TUBE	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Pin 9
V1	6AQ8 ECC85	†10K	1meg	0Ω	1Ω	0Ω	†10K	0Ω	0Ω	0Ω
V2	6AU6	1.5meg	0Ω	0Ω	.1Ω	†4800Ω	†4800Ω	100Ω		
V3	6AU6	.4Ω	0Ω	0Ω	1Ω	†4800Ω	†4800Ω	100Ω		
V4	6AU6	100K	0Ω	0Ω	1Ω	†4800Ω	†4800Ω	100Ω		
V5	6AL5	7800Ω	8300Ω	0Ω	.1Ω	170K	0Ω	170K		
V6	6C4	1.3900Ω	NC	1Ω	0Ω	1.3900Ω	2.2meg	49K		
V7	DM70	†4800Ω	NC	NC	160K	160K	NC	NC	1.330K	
V8	6X4	240Ω	NC	0Ω	1Ω	NC	230Ω	200K(Min)		

† MEASURED FROM PIN 7 OF V8
• MEASURED FROM PIN 7 OF V6
NC NO CONNECTION

PHOTOFACT* Folder

NEWCOMB MODEL KX-25

NEWCOMB MODEL KX-25

NEWCOMB MODEL KX-25

TRADE NAME	Newcomb Model KX-25
MANUFACTURER	Newcomb Audio Products Co., 6824 Lexington Ave., Hollywood 38, California
TYPE SET	AC Operated 8 Channel 25 Watt Audio Amplifier
TUBES	Fifteen
POWER SUPPLY	110-120 Volts AC-60 Cycles RATING 1.2 Amp. @ 117 Volts AC (140 Watts)

PROPERTY OF
L. F. BLANKENSHIP
3924 MEADE ST.
DENVER

HOWARD W. SAMS & CO., INC. • Indianapolis 5, Indiana

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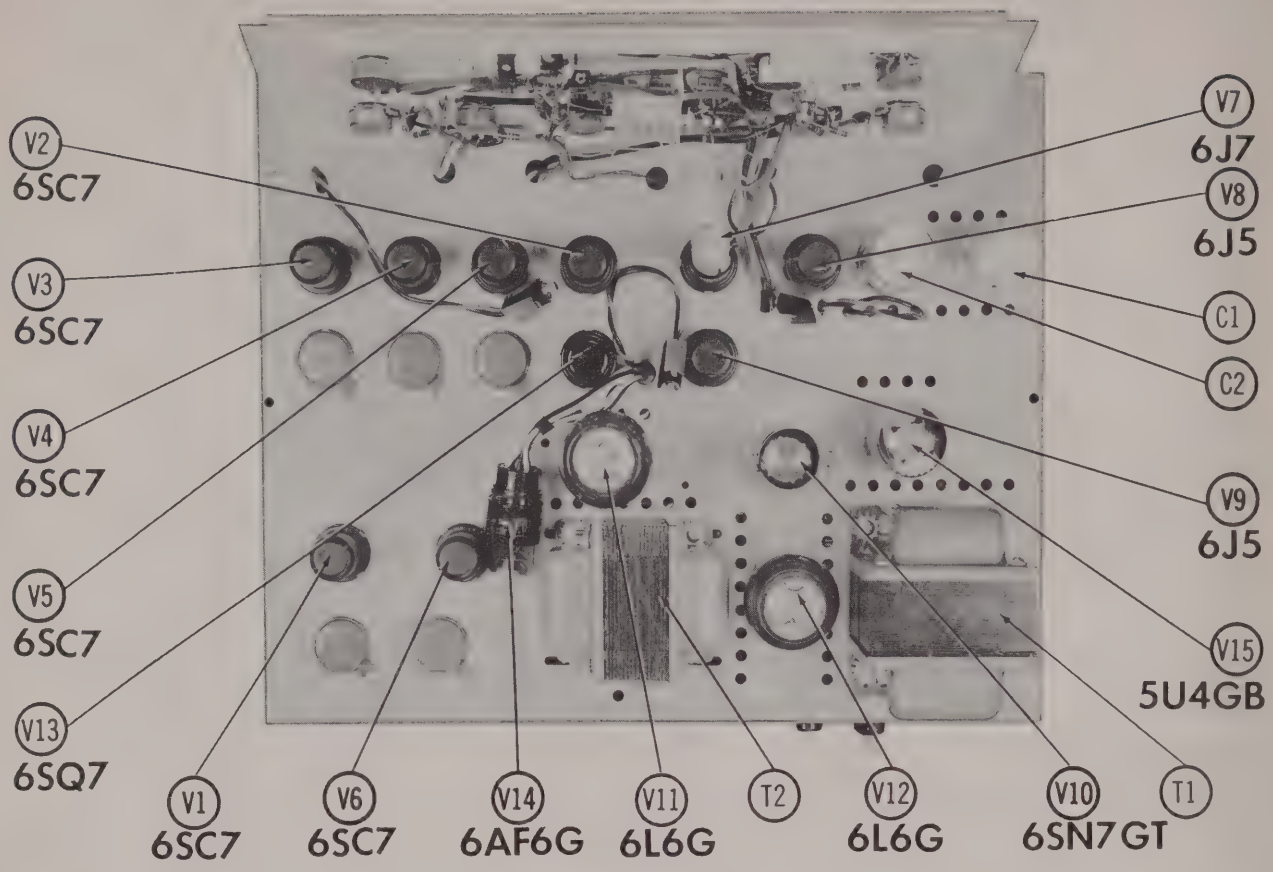
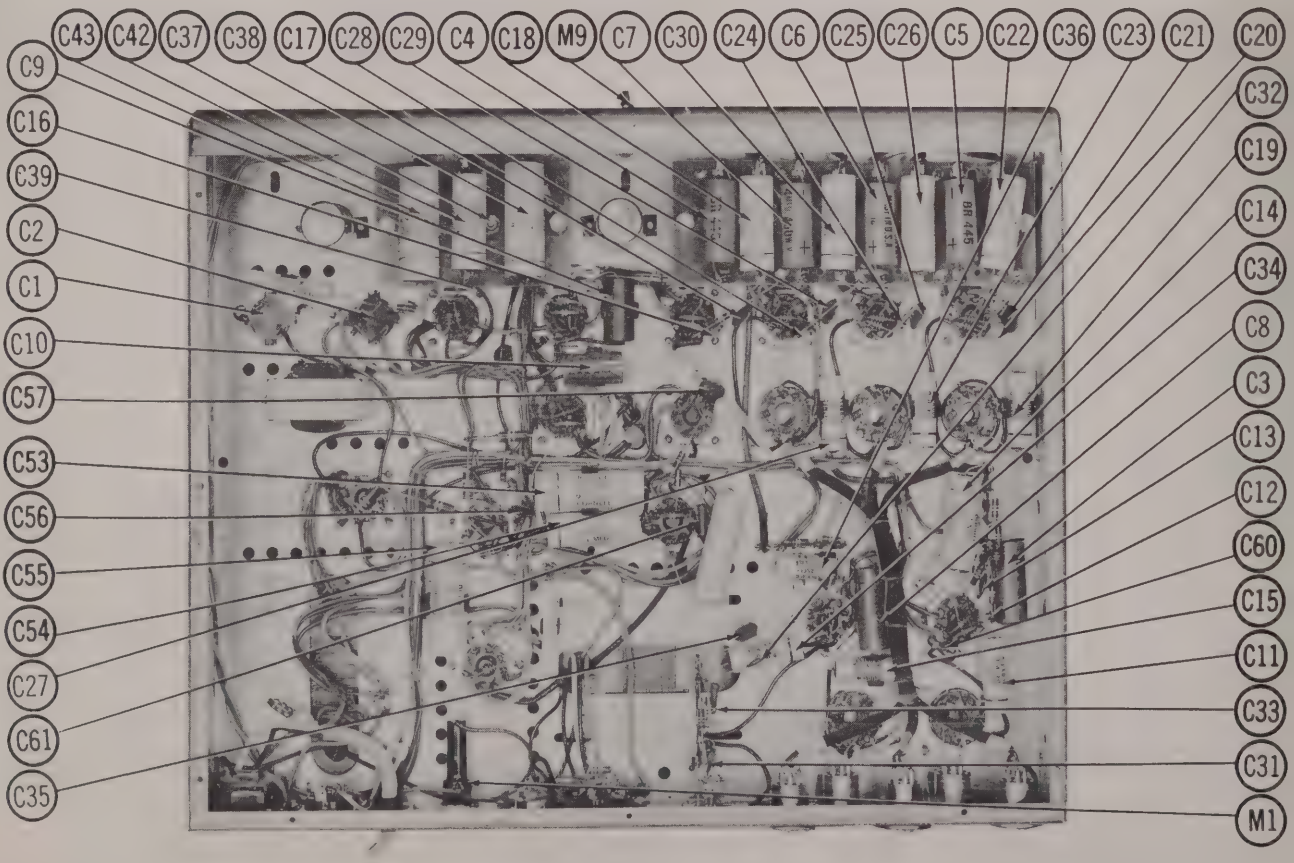
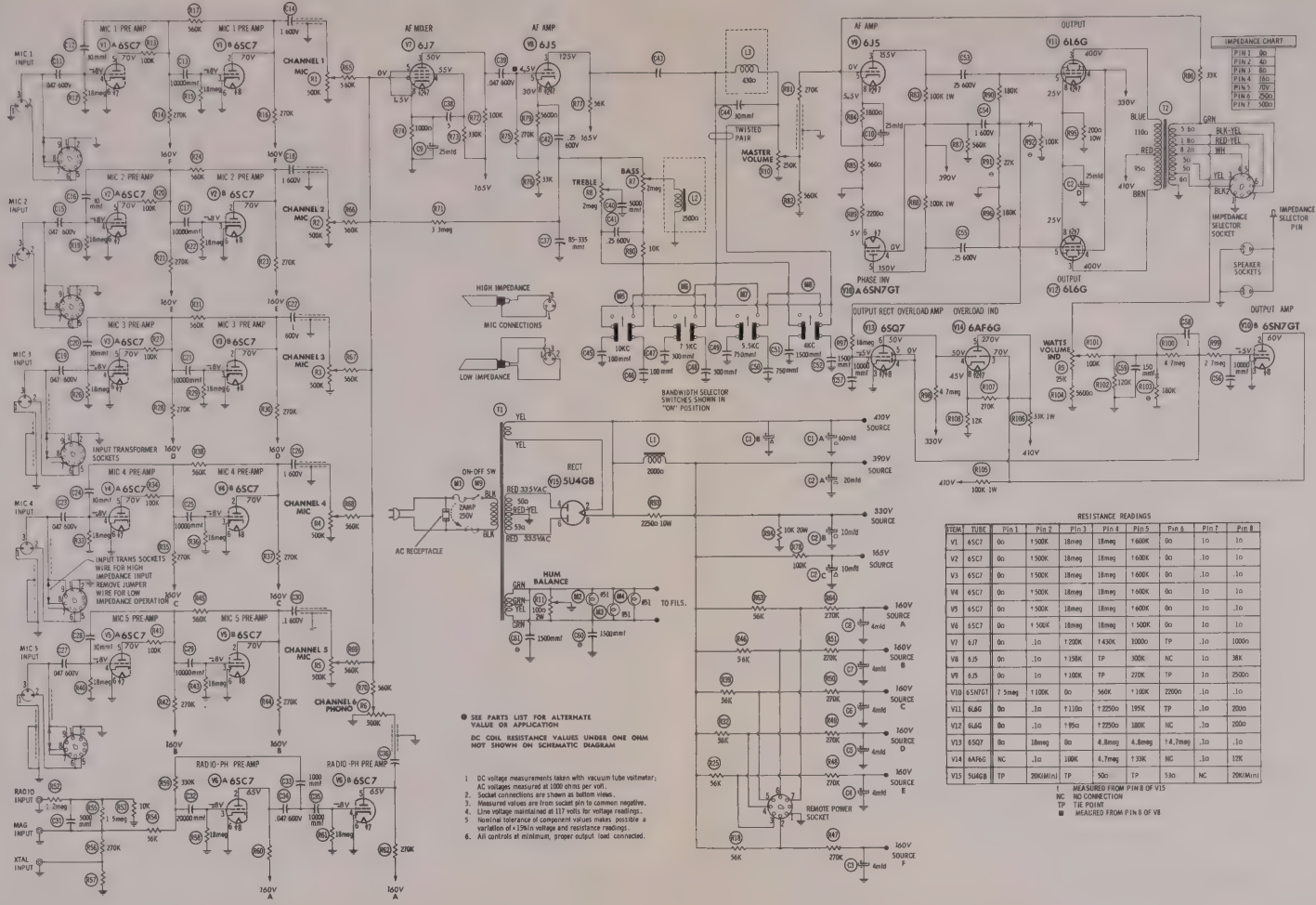


CHASSIS TOP VIEW



CHASSIS BOTTOM VIEW - CAPACITOR & MISC. IDENTIFICATION



● SEE PARTS LIST FOR ALTERNATE VALUE OR APPLICATION

DC COIL RESISTANCE VALUES UNDER ONE OHM NOT SHOWN ON SCHEMATIC DIAGRAM

1. DC voltage measurements taken with vacuum tube voltmeter; AC voltages measured at 1000 ohms per volt.
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to common negative.
4. Line voltage maintained at 117 volts for voltage readings.
5. Nominal tolerance of component values makes possible a variation of ±15% in voltage and resistance readings.
6. All controls at minimum, proper output load connected.

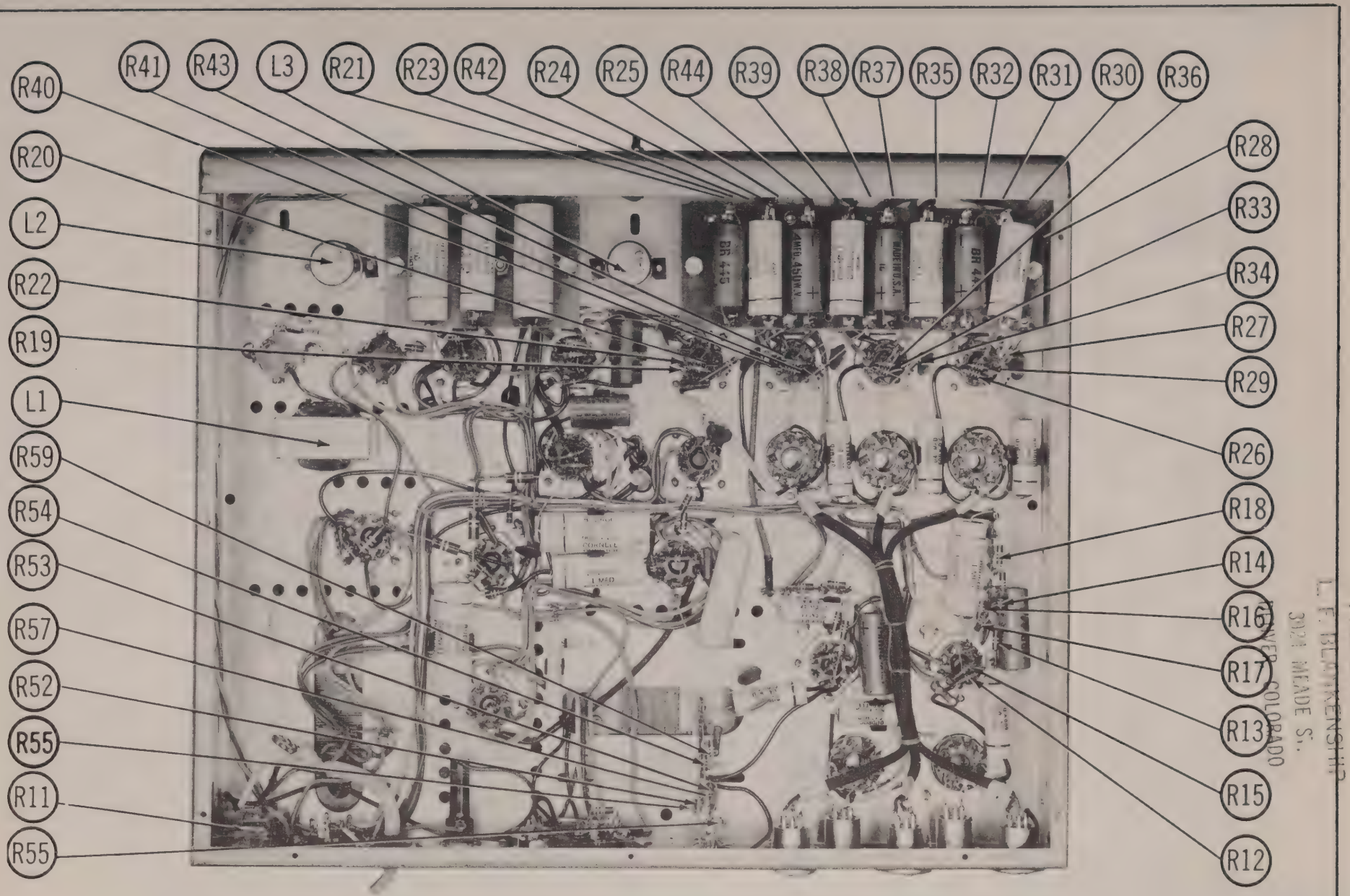
RESISTANCE READINGS

ITEM	TUBE	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8
V1	6SC7	0Ω	†500K	18meg	18meg	†600K	0Ω	1Ω	1Ω
V2	6SC7	0Ω	†500K	18meg	18meg	†600K	0Ω	1Ω	1Ω
V3	6SC7	0Ω	†500K	18meg	18meg	†600K	0Ω	1Ω	1Ω
V4	6SC7	0Ω	†500K	18meg	18meg	†600K	0Ω	1Ω	1Ω
V5	6SC7	0Ω	†500K	18meg	18meg	†600K	0Ω	1Ω	1Ω
V6	6SC7	0Ω	† 500K	18meg	18meg	† 500K	0Ω	1Ω	1Ω
V7	6J7	0Ω	1Ω	†220K	†430K	1000Ω	TP	1Ω	1000Ω
V8	6J5	0Ω	1Ω	†358K	TP	300K	NC	1Ω	38K
V9	6J5	0Ω	1Ω	†100K	TP	270K	TP	1Ω	2500Ω
V10	6SN7GT	7.5meg	†100K	0Ω	560K	†100K	2200Ω	1Ω	1Ω
V11	6L6G	0Ω	1Ω	†110Ω	†2250Ω	195K	TP	1Ω	200Ω
V12	6L6G	0Ω	1Ω	†95Ω	†2250Ω	180K	NC	1Ω	200Ω
V13	6SQ7	0Ω	18meg	0Ω	4.8meg	4.8meg	†4.7meg	1Ω	1Ω
V14	6AF6G	NC	1Ω	100K	4.7meg	†33K	NC	1Ω	12K
V15	5U4GB	TP	20K(Min)	TP	50Ω	TP	53Ω	NC	20K(Min)

† MEASURED FROM PIN 8 OF V15
NC NO CONNECTION
TP TIE POINT
■ MEASURED FROM PIN 8 OF V8

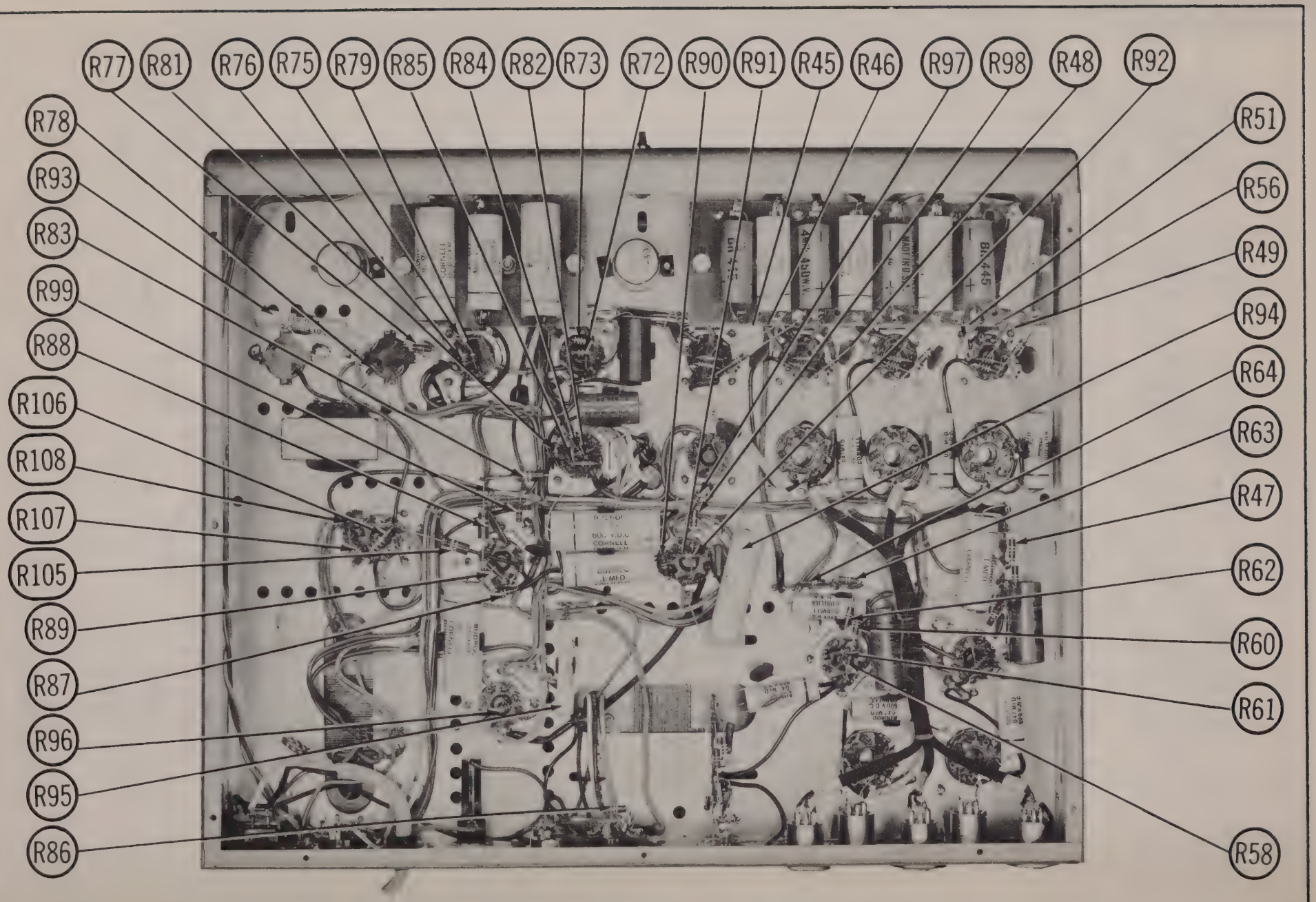
A PHOTOFACT STANDARD NOTATION SCHEMATIC
Howard W. Sams & Co., Inc. 1958

393-10



CHASSIS BOTTOM VIEW-RESISTOR IDENTIFICATION

PROPERTY OF
L. F. BLANKENSHIP
3021 MEADE ST.
DENVER, COLORADO



CHASSIS-BOTTOM VIEW-RESISTOR IDENTIFICATION

PARTS LIST AND DESCRIPTIONS

TUBES (GENERAL ELECTRIC, SYLVANIA)

ITEM No.	USE	TYPE	NOTES
V1	Mic 1 Preamplifier	6SC7	
V2	Mic 2 Preamplifier	6SC7	
V3	Mic 3 Preamplifier	6SC7	
V4	Mic 4 Preamplifier	6SC7	
V5	Mic 5 Preamplifier	6SC7	
V6	Radio-Phono Preamp.	6SC7	
V7	AF Mixer	6J7	
V8	AF Amplifier	6J5	

ITEM No.	USE	TYPE	NOTES
V9	AF Amplifier	6J5	
V10	Phase Inv. -Output Amp.	6SN7GT	
V11	Output	6L6G	
V12	Output	6L6G	
V13	Output Rectifier-Overload Amplifier	6SQ7	
V14	Overload Indicator	6AF6G	
V15	Rectifier	5U4GB	

ELECTROLYTIC CAPACITORS

ITEM No.	RATING CAP.	RATING VOLT.	REPLACEMENT DATA NEWCOMB PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	PYRAMID PART No.	SANGAMO PART No.	SPRAGUE PART No.
C1A	▰60	500	CE-33	AFH3-53	C0373			T-205	R2409 *
B	▲10	475							
C2A	▰20	475	CE-30	AFH4-19-10				Q-070 MT-0525	R2481 *
B	■10	475							
C	▲10	475							
D	25	50							
C3	4	450	CE-1	PRS450V4	BR445	TC70	TD-4-450	MT-4504	TVA-1702
C4	4	450	CE-1	PRS450V4	BR445	TC70	TD-4-450	MT-4504	TVA-1702
C5	4	450	CE-1	PRS450V4	BR445	TC70	TD-4-450	MT-4504	TVA-1702
C6	4	450	CE-1	PRS450V4	BR445	TC70	TD-4-450	MT-4504	TVA-1702
C7	4	450	CE-1	PRS450V4	BR445	TC70	TD-4-450	MT-4504	TVA-1702
C8	4	450	CE-1	PRS450V4	BR445	TC70	TD-4-450	MT-4504	TVA-1702
C9	25	50	CE-9	PRS50V25	BBR25-50	TC36	TD-25-50	MT-0525	TVA-1306
C10	25	50	CE-9	PRS50V25	BBR25-50	TC36	TD-25-50	MT-0525	TVA-1306

* Non Catalog Item

FIXED CAPACITORS

Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING CAP.	RATING VOLT	REPLACEMENT DATA NEWCOMB PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ERIE PART No.	MALLORY PART No.	SPRAGUE PART No.	NOTES
C11	.047	600	CP-49	P688N-047	DF-503	CUB6S47		GEM-6147	6TM-S47	
C12	30		CM-16	SI 30	DD-300	L10Q3	GP-30		5GA-Q3	
C13	10000		CM-32	BPD-01	DD-103	BYA6S1	ED-01	DC511	5HK-S1	
C14	.1	600	CP-52	P688N-1	DF-104	CUB6P1		GEM-601	6TM-P1	
C15	.047	600	CP-49	P688N-047	DF-503	CUB6S47		GEM-6147	6TM-S47	
C16	30		CM-16	SI 30	DD-300	L10Q3	GP-30		5GA-Q3	
C17	10000		CM-32	BPD-01	DD-103	BYA6S1	ED-01	DC511	5HK-S1	
C18	.1	600	CP-52	P688N-1	DF-104	CUB6P1		GEM-601	6TM-P1	
C19	.047	600	CP-49	P688N-047	DF-503	CUB6S47		GEM-6147	6TM-S47	
C20	30		CM-16	SI 30	DD-300	L10Q3	GP-30		5GA-Q3	
C21	10000		CM-32	BPD-01	DD-103	BYA6S1	ED-01	DC511	5HK-S1	
C22	.1	600	CP-52	P688N-1	DF-104	CUB6P1		GEM-601	6TM-P1	
C23	.047	600	CP-49	P688N-047	DF-503	CUB6S47		GEM-6147	6TM-S47	
C24	30		CM-16	SI 30	DD-300	L10Q3	GP-30		5GA-Q3	
C25	10000		CM-32	BPD-01	DD-103	BYA6S1	ED-01	DC511	5HK-S1	
C26	.1	600	CP-52	P688N-1	DF-104	CUB6P1		GEM-601	6TM-P1	
C27	.047	600	CP-49	P688N-047	DF-503	CUB6S47		GEM-6147	6TM-S47	
C28	30		CM-16	SI 30	DD-300	L10Q3	GP-30		5GA-Q3	
C29	10000		CM-32	BPD-01	DD-103	BYA6S1	ED-01	DC511	5HK-S1	
C30	.1	600	CP-52	P688N-1	DF-104	CUB6P1		GEM-601	6TM-P1	
C31	5000		CM-34	BPD-005	DD-502	BYA10D5	ED-005	DC525	5HK-D5	
C32	20000		CM-35	BPD-02	DD-203	BYB6S2	ED-02		5HK-S2	
C33	1000		CM-38	SI 1000	D6-102	LT6D1	GP-1000	UC-521	5GA-D1	
C34	.047	600	CP-49	P688N-047	DF-503	CUB6S47		GEM-6147	6TM-S47	
C35	10000		CM-32	BPD-01	DD-103	BYA6S1	ED-01	DC511	5HK-S1	
C36	.047	600	CP-49	P688N-047	DF-503	CUB6S47		GEM-6147	6TM-S47	
C37	85-335									
C38	.5	400	CP-74	P488N-5		CUB4P5		GEM-405	4TM-P5	
C39	.047	600	CP-49	P688N-047	DF-503	CUB6S47		GEM-6147	6TM-S47	
C40	5000		CM-34	BPD-005	DD-502	BYA10D5	ED-005	DC525	5HK-D5	
C41	.25	600	CP-53	P688N-25		CUB6P25		GEM-6025	6TM-P25	

PARTS LIST AND DESCRIPTIONS (Continued)

CAPACITORS (cont)

ITEM No.	RATING CAP.	RATING VOLT	REPLACEMENT DATA NEWCOMB PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ERIE PART No.	MALLORY PART No.	SPRAGUE PART No.	NOTES
C42	.25	600	CP-53	P688N-25		CUB6P25		GEM-6025	6TM-P25	
C43	.25	600	CP-53	P688N-25		CUB6P25		GEM-6025	6TM-P25	
C44	30		CM-16	SI 30	DD-300	L10Q3	GP-30		5GA-Q3	
C45	100		CM-14	SI 100	D6-101	LT6T1	GP-100	UC-531	5GA-T1	
C46	100		CM-14	SI 100	D6-101	LT6T1	GP-100	UC-531	5GA-T1	
C47	300		CM-15	SI 300	D6-301	LT6T3	GP-300	UC-533	5GA-T3	
C48	300		CM-15	SI 300	D6-301	LT6T3	GP-300	UC-533	5GA-T3	
C49	750		CM-24	SI 750	D6-751	LT6T75	GP-750	UC-5375	5GA-T75	
C50	750		CM-24	SI 750	D6-751	LT6T75	GP-750	UC-5375	5GA-T75	
C51	1500		CM-27	SI 1500	D6-152	LT6D15	GP-1500	UC-5215	5GA-D15	
C52	1500		CM-27	SI 1500	D6-152	LT6D15	GP-1500	UC-5215	5GA-D15	
C53	.25	600	CP-53	P688N-25		CUB6P25		GEM-6025	6TM-P25	
C54	.1	600	CP-52	P688N-1	DF-104	CUB6P1		GEM-601	6TM-P1	
C55	.25	600	CP-53	P688N-25		CUB6P25		GEM-6025	6TM-P25	
C56	10000		CM-32	BPD-01	DD-103	BYA6S1	ED-01	DC511	5HK-S1	
C57	10000		CM-32	BPD-01	DD-103	BYA6S1	ED-01	DC511	5HK-S1	
C58	.1	400	CP-51	P488N-1	DF-104	CUB4P1		GEM-401	4TM-P1	
C59	150		CM-23	SI 150	D6-151	LT6T15	GP-150	UC-5315	5GA-T15	
C60	1500		CM-27	SI 1500	D6-152	LT6D15	GP-1500	UC-5215	5GA-D15	①
C61	1500		CM-27	SI 1500	D6-152	LT6D15	GP-1500	UC-5215	5GA-D15	①

① Not used in some versions.

CONTROLS

ITEM No.	RATING RESISTANCE	RATING WATTS	REPLACEMENT DATA NEWCOMB PART No.	CENTRALAB PART No.	CLAROSTAT PART No.	IRC PART No.	MALLORY PART No.	INSTALLATION NOTES
R1A	500K	½	RV-41-K	B-60	A47-500K-Z	Q13-133	U48	Channel 1 (Mike)
B	Shaft			Not Req.	KSS-3	Not Req.	Not Req.	
R2A	500K	½	RV-41-K	B-60	A47-500K-Z	Q13-133	U48	Channel 2 (Mike)
B	Shaft			Not Req.	KSS-3	Not Req.	Not Req.	
R3A	500K	½	RV-41-K	B-60	A47-500K-Z	Q13-133	U48	Channel 3 (Mike)
B	Shaft			Not Req.	KSS-3	Not Req.	Not Req.	
R4A	500K	½	RV-41-K	B-60	A47-500K-Z	Q13-133	U48	Channel 4 (Mike)
B	Shaft			Not Req.	KSS-3	Not Req.	Not Req.	
R5A	500K	½	RV-41-K	B-60	A47-500K-Z	Q13-133	U48	Channel 5 (Mike)
B	Shaft			Not Req.	KSS-3	Not Req.	Not Req.	
R6A	500K	½	RV-41-K	B-60	A47-500K-Z	Q13-133	U48	Channel 6 (Phono)
B	Shaft			Not Req.	KSS-3	Not Req.	Not Req.	
R7A	2meg	½	RV-59-K	BT-78	A47F3-2meg	Q18-139X	UT-451	Bass, Tap ③ 1meg
B	Shaft			Not Req.	KSS-3	Not Req.	Not Req.	
R8A	2meg	½	RV-59-K	BT-78	A47F3-2meg	Q18-139X	UT-451	Treble, Tap ③ 1meg
B	Shaft			Not Req.	KSS-3	Not Req.	Not Req.	
R9A	25K	½	RV-37K	B-26	A47-25K-S	Q11-120	U29	Watts (Volume Indicator)
B	Shaft			Not Req.	KSS-3	Not Req.	Not Req.	
R10A	250K	½	RV-61-K	B-51	A47-250K-Z	Q13-130	U44	Master Volume
B	Shaft			Not Req.	KSS-3	Not Req.	Not Req.	
R11A	100Ω	2	RV-50	WN-101	A43-100	WPK100	R100L	Hum Balance (Wirewound)
B	Shaft			Not Req.	FKS-1/4	Not Req.	Not Req.	

RESISTORS

All wattages 1/2 watt, or less, unless otherwise listed.

ITEM No.	RATING OHMS	RATING WATT	NEWCOMB PART No.	NOTES
R12	18meg		RR-140	
R13	100K		RR-27	
R14	270K		RR-31	
R15	18meg		RR-140	
R16	270K		RR-31	
R17	560K		RR-34	
R18	56K		RR-25	
R19	18meg		RR-140	
R20	100K		RR-27	
R21	270K		RR-31	
R22	18meg		RR-140	
R23	270K		RR-31	
R24	560K		RR-34	
R25	56K		RR-25	

ITEM No.	RATING OHMS	RATING WATT	NEWCOMB PART No.	NOTES
R26	18meg		RR-140	
R27	100K		RR-27	
R28	270K		RR-31	
R29	18meg		RR-140	
R30	270K		RR-31	
R31	560K		RR-34	
R32	56K		RR-25	
R33	18meg		RR-140	
R34	100K		RR-27	
R35	270K		RR-31	
R36	18meg		RR-140	
R37	270K		RR-31	
R38	560K		RR-34	
R39	56K		RR-25	

PARTS LIST AND DESCRIPTIONS (Continued)

RESISTORS (cont)

ITEM No.	RATING OHMS	RATING WATT	NEWCOMB PART No.	NOTES
R40	18meg		RR-140	
R41	100K		RR-27	
R42	270K		RR-31	
R43	18meg		RR-140	
R44	270K		RR-31	
R45	560K		RR-34	
R46	56K		RR-25	
R47	270K		RR-31	
R48	270K		RR-31	
R49	270K		RR-31	
R50	270K		RR-31	
R51	270K		RR-31	
R52	1.2meg		RR-38	
R53	10K		RR-18	
R54	56K		RR-25	
R55	1.5meg		RR-39	
R56	270K		RR-31	
R57	56K		RR-25	
R58	18meg		RR-140	
R59	330K		RR-32	
R60	270K		RR-31	
R61	18meg		RR-140	
R62	270K		RR-31	
R63	56K		RR-25	
R64	270K		RR-31	
R65	560K		RR-34	
R66	560K		RR-34	
R67	560K		RR-34	
R68	560K		RR-34	
R69	560K		RR-34	
R70	560K		RR-34	
R71	3.3meg		RR-42	
R72	100K		RR-27	
R73	330K		RR-32	
R74	1000Ω		RR-6	
R75	270K		RR-31	
R76	33K		RR-23	
R77	56K		RR-25	
R78	100K		RR-27	
R79	5600Ω		RR-15	
R80	10K		RR-18	
R81	270K		RR-31	
R82	560K		RR-34	
R83	100K	1	RR-153	
R84	1800Ω		RR-9	
R85	560Ω		RR-4	
R86	33K		RR-23	
R87	560K		RR-34	
R88	100K	1	RR-153	
R89	2200Ω		RR-10	
R90	180K		RR-29	
R91	22K			Note 1
R92	100K		RR-27	Note 2
R93	2250Ω	10	RR-126	
R94	10K	20	RR-127	
R95	200Ω	10	RR-100	
R96	180K		RR-29	
R97	18meg		RR-140	
R98	4.7meg		RR-43	
R99	2.7meg		RR-41	
R100	4.7meg		RR-43	
R101	100K		RR-27	
R102	120K		RR-28	
R103	180K		RR-29	Note 2
R104	5600Ω		RR-15	
R105	100K	1	RR-153	
R106	33K	1	RR-139	
R107	270K		RR-31	
R108	12K		RR-19	

Note 1. Some versions use an 18K resistor in this application (Part #RR-20).
Note 2. Not used in some versions.

TRANSFORMER (POWER)

ITEM No.	RATING PRI.	RATING SEC. 1	RATING SEC. 2	RATING SEC. 3	REPLACEMENT DATA NEWCOMB PART No.	Halldorson PART No.	Merit PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.
T1	117V @ 1.2A	720VCT @ .170A	5V @ 3A	6.3VCT 6A	TR-201		P-3173		22R07	R-18A

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	IMPEDANCE PRI.	IMPEDANCE SEC.	REPLACEMENT DATA NEWCOMB PART No.	Halldorson PART No.	Merit PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.	NOTES
T2	5400Ω CT	500Ω Tap @ 250Ω, 70V, 16Ω 8Ω, 4Ω	TR-143						

CHOKES

ITEM No.	RATINGS TOTAL DIRECT CURRENT	RATINGS D.C. RESISTANCE	RATINGS INDUCTANCE (0 CURRENT 1000 ∿)	REPLACEMENT DATA NEWCOMB PART No.	Halldorson PART No.	Merit PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.
L1	.011A	2000Ω	80 Hy.	TC-5 ①					
L2	0A	2500Ω	23 Hy.	TC-29 ②				20C741 ④	
L3	0A	430Ω	3.2 Hy.	TC-30 ③					

① Filter Choke
② Low Frequency Tone Choke
③ High Frequency Tone Choke
④ Drill new mounting holes

PARTS LIST AND DESCRIPTIONS (Continued)

FUSES

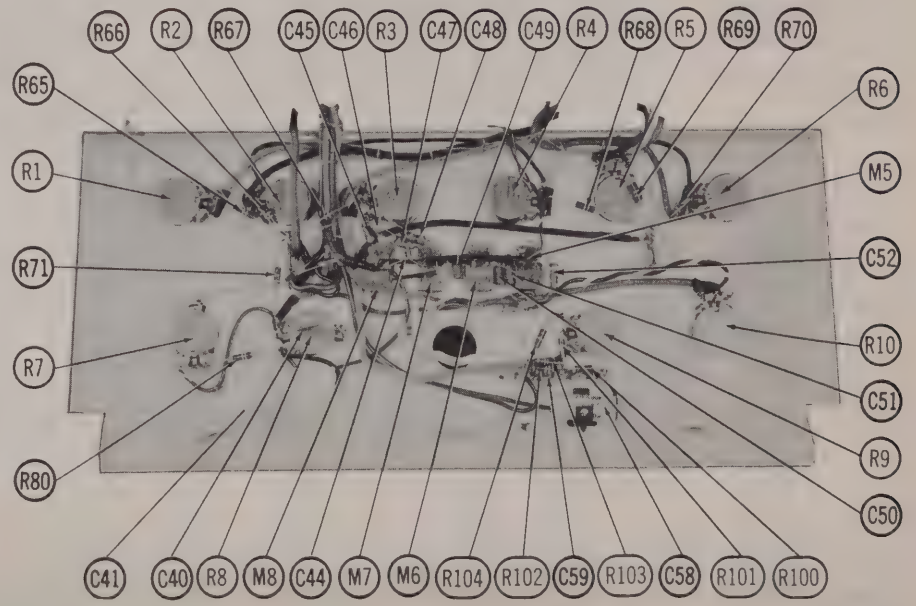
ITEM No.	TYPE	RATING	REPLACEMENT DATA NEWCOMB PART No. FUSE	NEWCOMB PART No. HOLDER	LITTELFUSE PART No. FUSE	LITTELFUSE PART No. HOLDER	BUSS PART No. FUSE	BUSS PART No. HOLDER
M1	3AG	2A 250V	FA-5		312002. (3AG 2A 250V)	341001	AGC2	HKP

MISCELLANEOUS

ITEM No.	PART NAME	NEWCOMB PART No.	NOTES
M2	Dial Lamp	DL-5	#51 (Alternate Type #47)
M3	Dial Lamp	DL-5	#51 (Alternate Type #47)
M4	Dial Lamp	DL-5	#51 (Alternate Type #47)
M5	Switch	SY-73	Bandwidth Selector (Slide Type SPDT)
M6	Switch	SY-73	Bandwidth Selector (Slide Type SPDT)
M7	Switch	SY-73	Bandwidth Selector (Slide Type SPDT)
M8	Switch	SY-73	Bandwidth Selector (Slide Type SPDT)
M9	Switch	SY-63	Power On-Off (Toggle Type)

WIRING DATA

General-use Unshielded Hook-up Wire ..... Use BELDEN No. 8530 (Solid) Available in Ten Colors
8524 (Stranded) Available in Ten Colors
Power Cord ..... Use BELDEN No. 1765-B (6 Ft. Length)
1725-K (7½ Ft. Length)
Low-Loss Shielded Lead (Interconnecting)..... Use BELDEN No. 8401
Phono Pick-up Arm Cable ..... Use BELDEN No. 8430 (Two Conductor - Twisted)



CHASSIS-CONTROL PANEL REAR

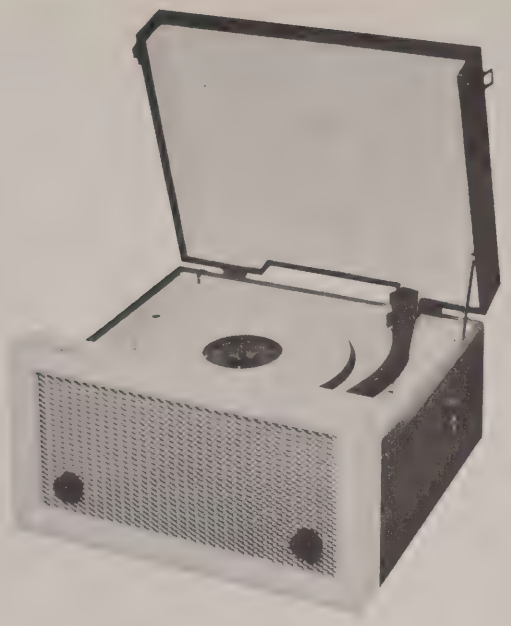
PHOTOFACT* Folder

*TRADE MARK

EIA MEMBER ELECTRONIC INDUSTRIES ASSOCIATION

V-M MODEL 155A

V-M MODEL 155A



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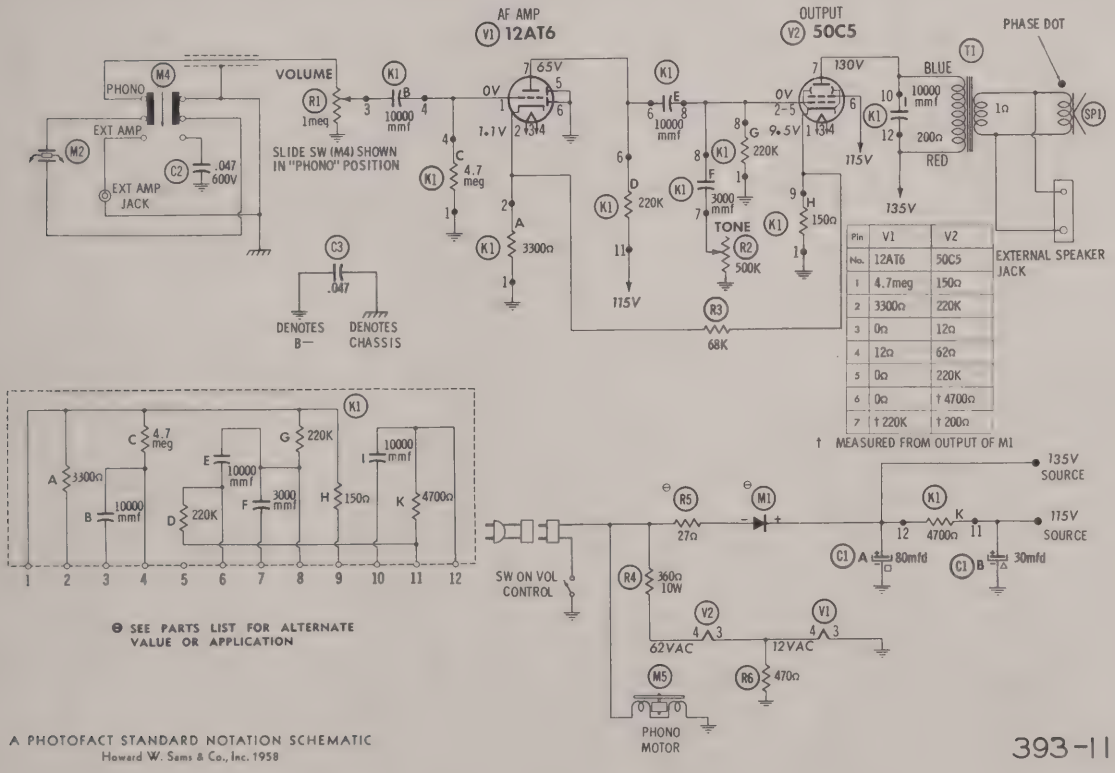
V-M MODEL 155A

TRADE NAME	V-M Model 155A
MANUFACTURER	V-M Corp., Benton Harbor, Michigan
TYPE SET	AC Operated Phono Amplifier With 4 Speed Manual Record Player
TUBES (Two)	Types 12AT6 AF Amplifier, 50C5 Output
POWER SUPPLY	110-120 Volts AC - 60 Cycles RATING .21 Amp, @ 117 Volts AC (21 Watts Without Motor)



Pin No.	V1 12AT6	V2 50C5
1	4.7meg	150Ω
2	3300Ω	220K
3	0Ω	12Ω
4	12Ω	62Ω
5	0Ω	220K
6	0Ω	† 4700Ω
7	† 220K	† 200Ω

† MEASURED FROM OUTPUT OF M1

⊖ SEE PARTS LIST FOR ALTERNATE VALUE OR APPLICATION

A PHOTOFACT STANDARD NOTATION SCHEMATIC
Howard W. Sams & Co., Inc. 1958

393-11

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H201

FOLDER 11

PARTS LIST AND DESCRIPTIONS

TUBES (GENERAL ELECTRIC, SYLVANIA)

ITEM No.	USE	TYPE	NOTES
V1	AF Amplifier	12AT6	

ITEM No.	USE	TYPE	NOTES
V2	Output	50C5	

ELECTROLYTIC CAPACITORS

ITEM No.	RATING		REPLACEMENT DATA						
	CAP.	VOLT.	V-M PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	PYRAMID PART No.	SANGAMO PART No.	SPRAGUE PART No.
C1A	■80	150	12063	PRS150V8040	BBRD8415	TCD498	TDLD-10	MTD-303	TVA-2460
B	▲30	150							

FIXED CAPACITORS

Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING		REPLACEMENT DATA							NOTES
	CAP.	VOLT	V-M PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ERIE PART No.	MALLORY PART No.	SPRAGUE PART No.	
C2	.047	600	12073	P688N-047	DF-503	CUB6S47		GEM-6147	6TM-S47	
C3	.047	400	12070			BC6S47J		ACE6147	6SE-S47	

CONTROLS

ITEM No.	RATING		REPLACEMENT DATA					INSTALLATION NOTES
	RESISTANCE	WATTS	V-M PART No.	CENTRALAB PART No.	CLAROSTAT PART No.	IRC PART No.	MALLORY PART No.	
R1A	1meg	½	12327	B-70	A47-1meg-Z	Q13-137	U53	Volume
B	Shaft			Not Req.	FS-3	Not Req.	Not Req.	
C	Switch			KB-1 or KR-1	SWE-12	76-1	US-26	*
R2A	500K	½	12326	B-60	A47-500K-Z	Q13-133	U48	Tone
B	Shaft			Not Req.	FS-3	Not Req.	Not Req.	

* Use KR-1 on Red Label Control only.

RESISTORS

All wattages 1/2 watt, or less, unless otherwise listed.

ITEM No.	RATING		V-M PART No.	NOTES
	OHMS	WATT		
R3	68K		11173	
R4	360Ω	10	12311	

ITEM No.	RATING		V-M PART No.	NOTES
	OHMS	WATT		
R5	27Ω		12309	Note 1
R6	470Ω		10653	

Note 1. Fuse Type Resistor

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	IMPEDANCE		REPLACEMENT DATA						NOTES
	PRI.	SEC.	V-M PART No.	Halldorson PART No.	Merit PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.	
T1	2300Ω	3-4Ω	Part of SP1	Z1101	A-3025	A-3332	24S53	S-12X	

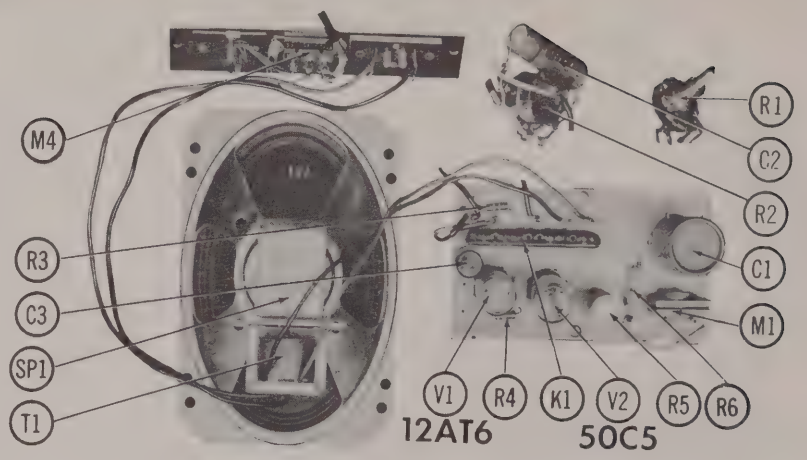
SPEAKER

ITEM No.	TYPE			REPLACEMENT DATA		NOTES
	SIZE	FIELD	V. C. IMP.	V-M PART No.	QUAM PART No.	
SP1	4" X 6"	PM	3-4Ω	14731 ①	46A15	① Includes T1

COMPONENT COMBINATIONS

ITEM No.	USE	DESCRIPTION	V-M PART No.	REPLACEMENT DATA
K1	Audio-Power Circuitry	10000mmf, 10000mmf, 3000mmf, 10000mmf, 3300Ω, 4.7meg, 220K, 220K, 150Ω, 4700Ω	12542	Erie 712-04

CHASSIS—TOP VIEW



RECTIFIERS

ITEM No.	RATING	REPLACEMENT DATA				NOTES
	CURRENT (Measured)	V-M PART No.	FEDERAL PART No.	INTERNATIONAL PART No.	SARKES TARZIAN PART No.	
M1	.059A	12527 ①	1444 ①	RS065 ①	65 ① M150 ②	① Selenium Type ② Silicon Type

PHONO CARTRIDGE

ITEM No.	REPLACEMENT DATA					REMARKS
	V-M PART No.	ASTATIC PART No.		ELECTRO-VOICE PART No.		
		CARTRIDGE	NEEDLE	CARTRIDGE	MOUNT	
M2	7316	55-T and 81-TB P-55-T *	GD-J	56	PT-2	* Tone Arm Complete With Cartridge

ASTATIC NEEDLE LISTING SHOWN ABOVE IS SPECIFIED FOR THE RESPECTIVE REPLACEMENT CARTRIDGE LISTED. FOR ORIGINAL CARTRIDGE NEEDLE REPLACEMENTS SEE BELOW.

PHONO NEEDLE

(FOR REPLACEMENT IN ORIGINAL EQUIPMENT CARTRIDGE)

ITEM No.	REPLACEMENT DATA			REMARKS
	V-M PART No.	JENSEN PART No.	WALCO PART No.	
M3	7317	† S-66 or †♦ S-66SD or ♦ S-66D	† W75TPS or †♦ W75DS or ♦ W75TPD	* Metal † Jewel ♦ Diamond

MISCELLANEOUS

ITEM No.	PART NAME	V-M PART No.	NOTES
M4	Switch	9242	Selector (Slide Type DPDT)
M5	Phono Motor	6021	

WIRING DATA

General-use Unshielded Hook-up Wire ..... Use BELDEN No. 8530 (Solid) Available in Ten Colors
8524 (Stranded) Available in Ten Colors

Power Cord ..... Use BELDEN No. 1765-B (6 Ft. Length)
1725-K (7½ Ft. Length)

Low-Loss Shielded Lead (Interconnecting)..... Use BELDEN No. 8401

Phono Pick-up Arm Cable ..... Use BELDEN No. 8430 (Two Conductor - Twisted)

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WEBCOR MODELS 2812, 2816, 2822, 2892, 2896

WEBCOR MODELS 2812, 2816, 2822, 2892, 2896

GENERAL INFORMATION

The "Webcor" Models 2816, 2896, 2812, 2822, and 2892 Tape Recorders consist of two basic sections, a tape transport mechanism and a record-playback amplifier.

All models are identical in basic design and construction with the exception that Models 2812, 2816, 2892 and 2896 are monaural and Model 2822 is Stereo.

This manual covers all mechanical and electrical problems and adjustments. Operating instructions included in this manual will suffice to check the units for overall performance.

The "Webcor" Models have two speeds, 7 1/2" and 3 3/4" per second. Using both tracks, the recording times are as follows:

Reel Size	3 3/4" Speed	7 1/2" Speed
5" (600 ft.)	1 Hour	1/2 Hour
7" (1200 ft.)	2 Hours	1 Hour

The "Webcor" Models are designed to operate on 60 cycle, 105-120 volts, AC supply only.

Manufactured by:

Webcor
5610 Bloomingdale Ave.
Chicago 39, Illinois

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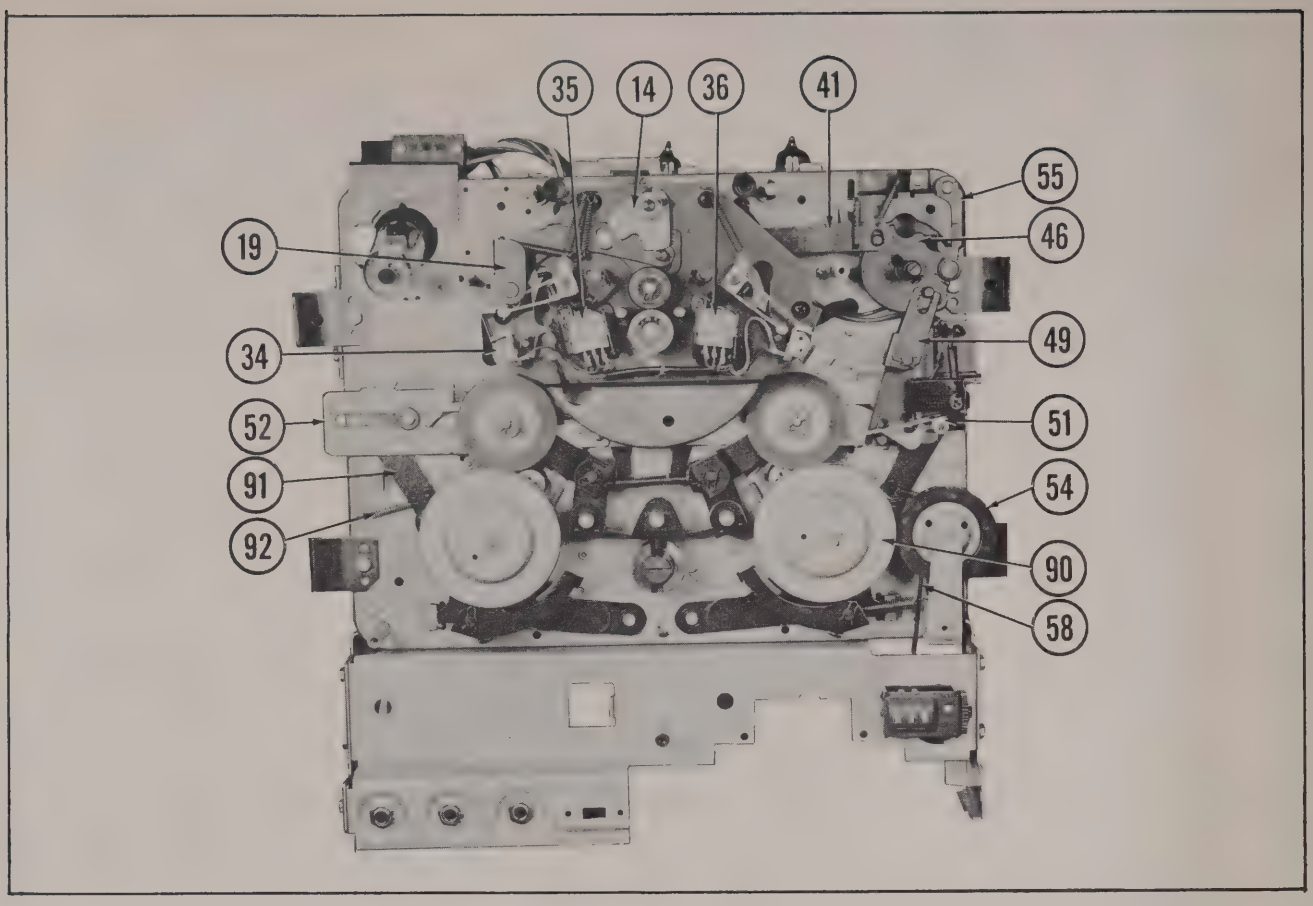

FIGURE 1

SPECIFICATIONS

Net Weight: 51 pounds.

Size: 11 1/2"x16 3/4"x19 3/4" models 2816 and 2896
11" x 19" x 19" models 2812, 2822 and 2892.

Power Consumption: 120 Watts.

Wow-Flutter: Less than .4%.

Response: 50 to 10,000 cycles± 3db at 3 3/4 I.P.S.
40 to 15,000 cycles± 3db at 7 1/2 I.P.S.

Signal To Noise: 45db

Input Jack: High level, high impedance for microphone. Low level, high impedance for direct recording from phono or radio.

Speaker Jack: 3.2 ohms for external speaker models 2812, 2822 and 2892. Models 2816 and 2896, 8 ohms for external speaker.

Ext. Amp. Jack 2822: For second channel of stereo. sound system.

Remote Jack 2822: For "Aural Balance" Remote Control.

AC Convenience Output 2822: To furnish power to amplifier in second system.

Recording Level Indicator: Cathode-ray tube indicating normal and overload.

Output: 5Watts undistorted, 8Watts peak.

Motors: (2) 4-pole heavy duty-electronically balanced.

Erase: Electro magnetic, supersonic frequency (60KC) designed for low noise erase.

Radio 2892: AM Radio Tuner with printed super-heterodyne circuit.

AM Radio BP2896: 3 transistor, printed superheterodyne circuit.

FUNCTION OF THE WEBCOR CONTROLS

Tape Counter

This counter permits you to find quickly any particular portion of a recorder tape. Rotate the Reset Wheel Toward the rear of the unit to set the dial at 000.

Cathode Ray Recording Level Indicator

This "eye" shows proper sound level for recording.

Volume Control And On-Off Switch

Turning this control clockwise turns unit "on".

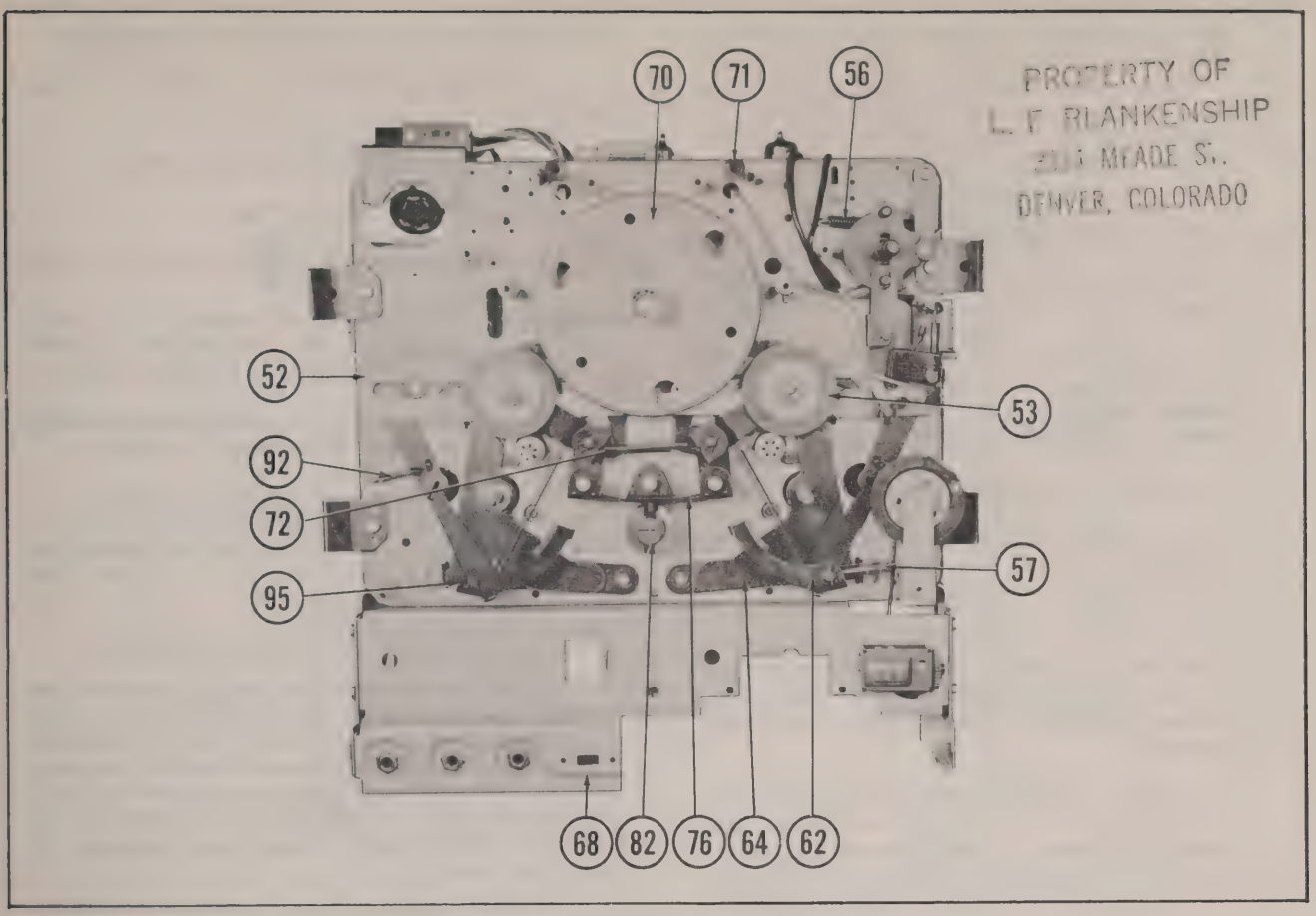

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FIGURE 2

Further clockwise rotation increases the volume level for either record or play-back position.

Tape Speed Adjustment

This control permits you to adjust tape speed to either 3 3/4 inches per second or 7 1/2 inches per second. The Tape Speed Adjustment may be turned to either position with a small coin.

Edit Button

The Edit Button Allows "on the spot" editing of tapes. Tape may be stopped at any time when recording for editing.

Record-Playback Control

This combines in one control the "Recording", "Playback", "Rewinding", and "Fast Forward" features of this recorder. This control must be used in conjunction with the Record Saftey Button when recording.

OPERATING INSTRUCTION

Preparing Recorder For Operation

1. Set tape speed adjustment to 3 3/4 or 7 1/2 inches per second. "Webcor" recording heads are designed for dual track recording, (except for Model 2822) half of the tape width is recorded first. When the reel is turned over the remaining half is recorded.

2. Place full reel of tape on either hub so that slot in reel hub fits snugly over the shaft key. Do the same with the empty reel on the other hub.

Note: These recorders record in either direction without reel turnover.

3. To thread tape properly, with full reel on the left hub, unwind about 18" of tape. Slip tape into slot at left end of Threading Slot and hold in place with the thumb so it does not slip. Now slide rest of tape into slot from left to right by feeding tape into slot while holding tape against back side of slot opening. When tape is threaded through slot, make three or four turns around the empty reel.

Note: With full reel on right hub, reverse above procedure.

4. Now set Tape Counter to 000.

5. Turn Monitor control "Off".

Note: Be sure the tape reels are wound with the dull side of the tape facing toward the inside of the reel. This is called an "A" wind.

5. Adjust recording level by speaking into the microphone, in a normal tone of voice. Notice that the Cathode-ray Level Indicator shows a "shadow" or dark segment at the bottom of the "eye". This shadow opens and closes as you

speak. Now set the Volume Control so that the "shadow" barely closes on the loudest sound. Overlap is not desirable and you can easily see this overlap by the bright green line when the shadow closes. Overlap will cause distortion in your recordings.

How to Record From Microphone

1. Set Record-Playback control to "Stop" position.

2. Insert the line cord plug into a 105 to 120 volt, 60 cycle, AC outlet. Caution: Severe damage will result if connection is made to a direct current (DC) line.

3. Connect Microphone to input jack.

4. Turn Volume-On control clockwise to turn unit "On". Allow sufficient time for amplifier to "warm-up" before starting to record.

6. If it is desired to monitor a recording, turn Tone Monitor control counter-clockwise until it clicks. (If unit squeaks, move mike away from unit or turn tone control counter-clockwise to Bass).

7. Push Record Button (1) down and turn Record-Playback control (2) to either the Right or Left position. If your full reel of tape is on the left side, then you turn knob to Right; if full reel is on the right shaft, turn Record-Playback to Left.

8. Move Record-Playback control to "Stop" position when recording is finished.

Note: When recording with monitor "On", tonal quality of monitor can be adjusted to suit the operator. However, the tone control does not effect the tonal quality of the tape being recorded. Record characteristics are pre-set at the factory.

How To Play A Recording

1. To playback turn Record-Playback control to Right or Left position as the case may be (Be sure you do not press down R (record) button (1) or you will erase the recording).

2. Set the tone and volume controls for desired listening level.

Note: The tone control varies the treble and bass response of the play-back.

How To Record From Phono, Radio, Or TV

1. Connect Webcor input cord No. 2927 between output of radio, phono, or TV receiver to input of tape recorder.

2. If you want to monitor the recording, turn monitor-tone control on/or counter-clockwise from "Off" position.

3. Now follow same procedure for recording from microphone and play-back.

How To Use Recorder As Public Address System

1. Set Record-Playback control to "Stop" position.

2. Connect microphone to input jack.

3. Turn Monitor control "On."

4. Adjust Volume and tone control as desired.

Note: If microphone feedback (squeal) occurs, move microphone away from speaker or adjust volume or tone control to eliminate squeal.

5. You may record your speech during delivery by following recording instructions on Page 3.

How To Use Recorder With External Speaker

1. Plug external speaker into the output jack which is located at the front of the recorder. (The output impedance is 8 ohms.)

How To Use Recorder With Another Recorder

1. For recording from another recorder use Webcor No. 2943 Input-Output Cord. Connect Cord from output of auxiliary recorder to input of recorder. Auxiliary recorder must be set to "Record" position. Turn volume control of auxiliary recorder to fairly high volume, but not so high as to cause distortion. If sound is "mushy" turn volume down gradually till distortion clears.

2. Adjust volume control of recorder to proper recording level.

3. Now follow standard recording and play-back procedure.

How To Use Recorder With External Amplifier

1. Connect Webcor output cord No. 2928 from the Ext. Amp. jack of recorder to the phone, or auxiliary input of the external amplifier.

2. Follow same procedure for play-back as previously described.

Note: The external amplifier jack at the rear of the recorder provides cathode follower output at a level of 1 1/2 volts maximum.

How To Use Fast Rewind

1. If you wish to make a fast rewind, then press down on the Record-Play-back control and turn to either Right or Left position. Again, do not press down the R "Record" button or you will erase the recording.

How To Erase A Recording

1. Thread tape to be erased, on machine.

2. Set Volume control as low as possible.

3. Depress "R" button and turn wing knob to proper position. The recording heads will erase the tape completely.

4. If you wish, you can make a new recording on a tape already recorded without going through the

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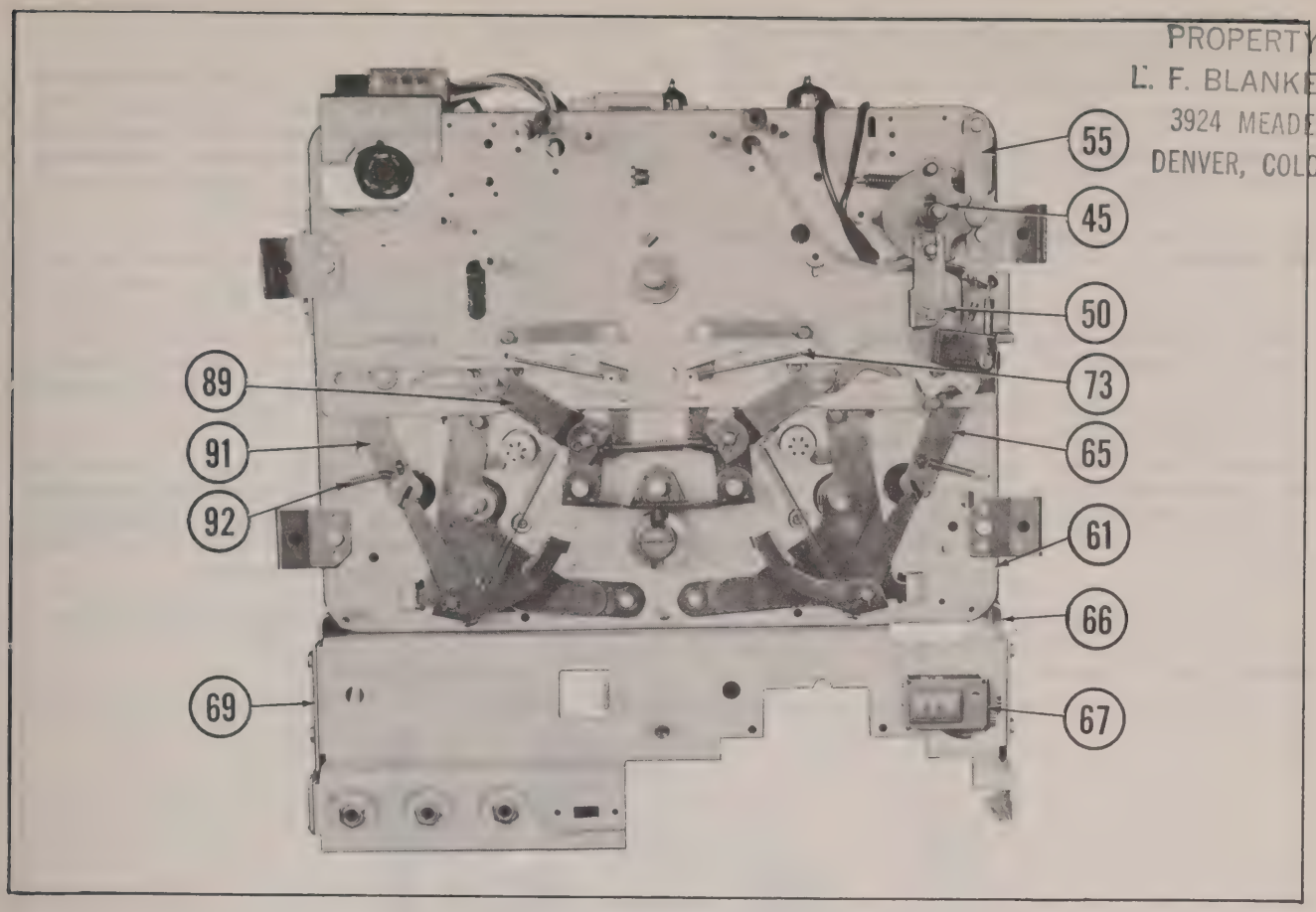

FIGURE 3

above steps. Simply start recording and this will automatically erase the old recording as you make the new recordings.

MECHANICAL TROUBLE SHOOTING

If the complaint or trouble on a given recorder to be serviced is not known it is suggested that the "Operating Instructions" be completely performed while referring to the "Functions Of The Controls". From this procedure it can be determined if the transport of tape is normal and, therefore, if the trouble is mechanical, electrical or possibly a combination of both. If improper operation of the tape transport mechanism is noted, reference to the sample list of troubles and possible causes will assist correction. It is possible that normal tape transport occurs but that electrical trouble prevents the proper recording or play-back of the tape. Whether or not such trouble exists can be determined by making a sample recording and attempting to play it back.

Checking Tape Speed

A marked variation from normal tape speed is a good indication of worn idler wheels, or the need for lubrication. Since it is not practical to check tape speed directly, the speed of the capstan which controls tape speed may be checked. Since the speed of the reels varies with the amount of tape wound, it is not possible to use the reel speed to check the speed of the tape. The capstan speed should be checked while it is under normal tape load in the Record or Play-back position. Normal capstan speed should be 152 to 159 R. P. M. with the speed selector in the 7 1/2 inches per second position or 76 to 80 R. P. M. with the speed selector in the 3 3/4 inches per second position. It will be found much easier to check the R. P. M. with the tape running at 3 3/4 inches per second. A simple method that may be employed to check the capstan speed consists of securing a small strip of tape to the outer edge on top of the capstan. By using the second hand of a watch, the actual number of turns occuring in one minute can be easily counted.

A 1200ft. 7 inch reel of tape should fast wind in about 3 minutes. Variations in fast transport speed may be the result of normal clutch slippage.

Wow-Waver

Anything that causes the tape to pass the recording heads at a varying speed will result in Wow-Waver. This gives a varying pitch or tinny sound which is most noticeable when recording or playing back piano, organ or slow passages of classical music. One means of checking for Wow is to play-back a pre-recorded high frequency test tape. If Wow is present, it will be noticeable to the ear. The capstan and drum assembly, pressure roller, and idler wheels are manufactured to a very close tolerance to assure a minimum of Wow-Waver. The development of such a condition is generally due to one or more of the following causes:

1. Contaminated capstan surface (70). The capstan surface must be kept free of oil and iron oxide particles. This surface should be thoroughly dried after the application of alcohol.

2. Dirty capstan drum (70), pressure roller (17), idler wheels (86), or motor shaft. Use alcohol on a clean cloth and wipe the driving surfaces of these parts.

Do not use carbon tetrachloride when cleaning any rubber surfaces.

3. A worn or pitted pressure roller (17) should be replaced.

4. The pressure roller (17) should be parallel with the capstan. If the mounting shaft is bent, it should be straightened.

5. The pressure roller tension spring may be exerting insufficient tension. This would allow the pressure roller (17) to be moved (by hand) away from the capstan with only light force applied. The pressure roller should contact the capstan with a force of 2 to 2 1/4 lbs. This may be checked with a spring scale.

6. Idler Wheels (86) eccentric or tilted. If the wheels are tilted, reform the wheel arm so the idler appears level to the eye.

Tape Squeal

A squeal or squeaking effect will sometimes be encountered after many hours of operation. This generally is caused by an accumulation of tape coating oxide on the pressure pads and possible compressing of the pads which, in turn, exert excessive pressure on the recording tape, causing friction.

Tape that has been abused in storage or use may cause an excessive accumulation of iron oxide particles to adhere to the tape guides, pressure pads, or recording head. This resistance to smooth tape transport will cause a friction squeal. Usually, cleaning these components with alcohol, or replacing them if necessary, will correct the trouble.

Varying frictional forces can be a source of frequency modulation noise that may be introuduced into the program when recording, and subsequent play-back. This frequency modulation noise is most pronounced on high audio frequencies.

The most common causes for this difficulty are:

1. Mis-aligned heads.

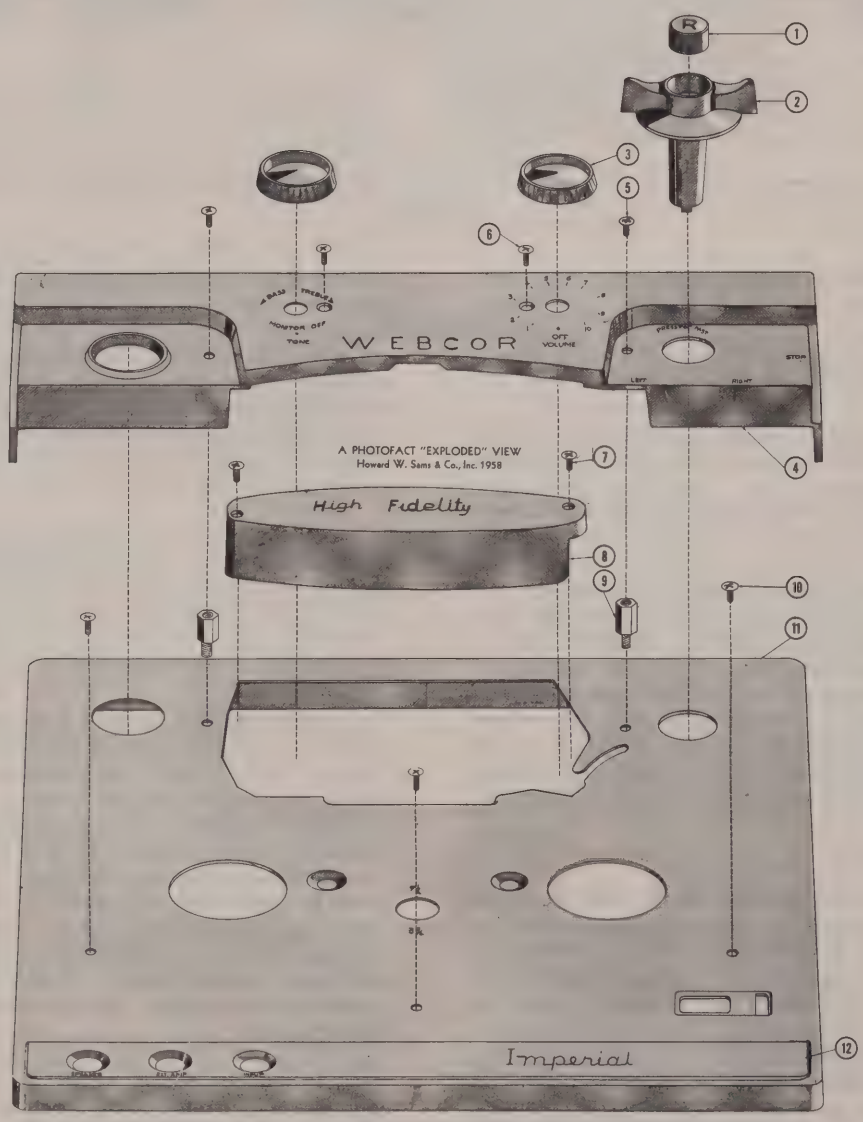

FIGURE 4A. EXPLODED VIEW OF PARTS ABOVE TOP PLATE.

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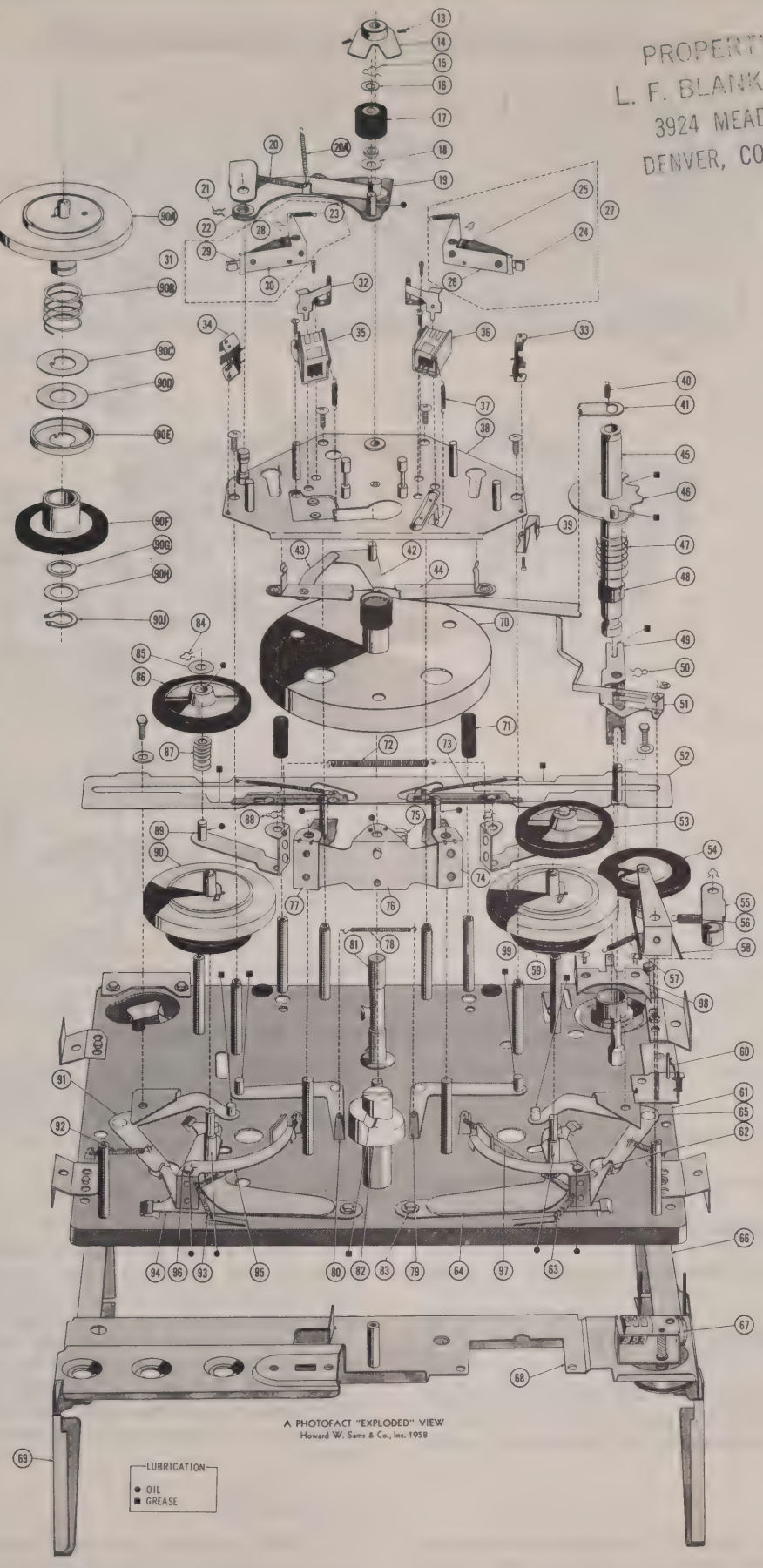


FIGURE 4B. EXPLODED VIEW OF PARTS BELOW TOP PLATE.

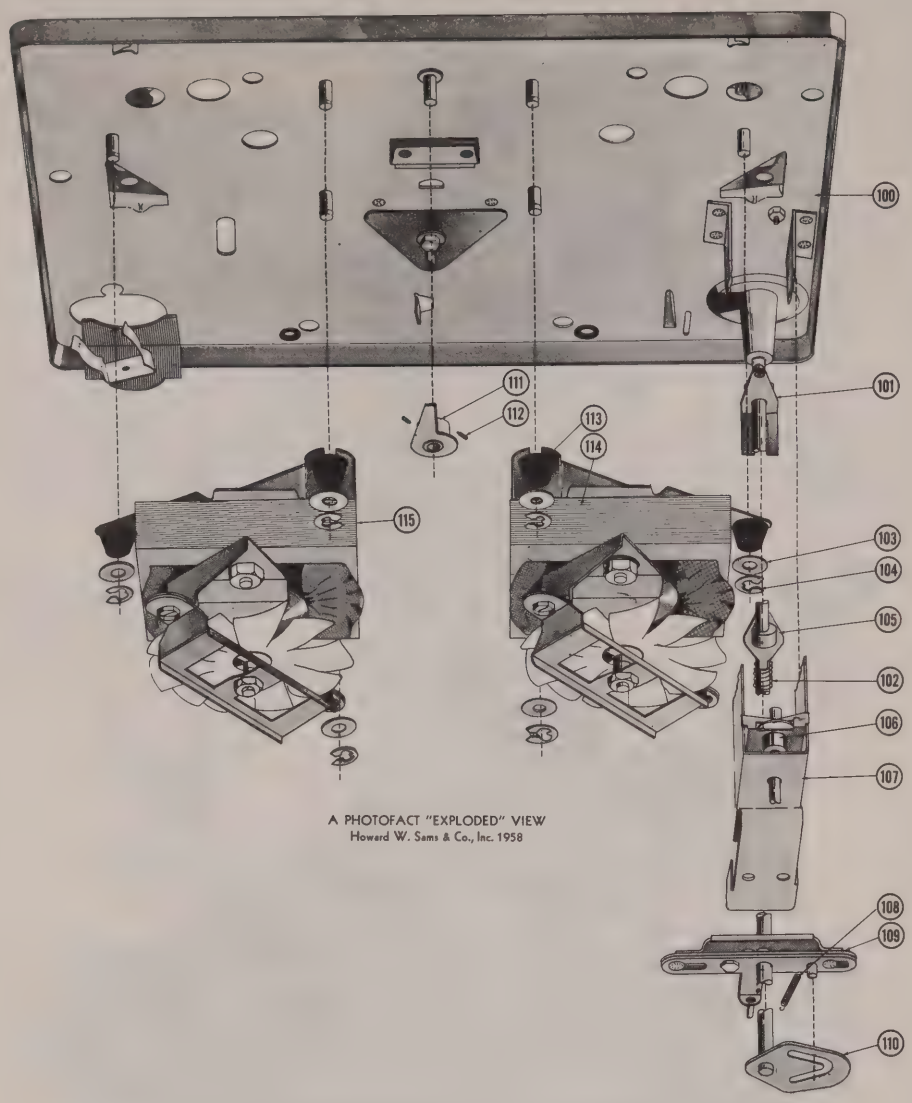


FIGURE 4C. EXPLODED VIEW OF PARTS BELOW BASEPLATE.

2. Dirty pressure pads, guides, or head pole pieces.

3. Excessive tape tension.

4. Worn or grooved guides or head pole pieces.

5. Pressure roller binding, hardened, or worn.

6. Excessive pressure pad pressure, or acute angle.

MECHANICAL ADJUSTMENTS

Mechanical adjustments will be found to consist of forming a mechanism or part into correct position if it is not functioning properly, or replacement of the part.

Pressure Roller

The pressure roller (17) should be parallel with the capstan With the spring clip (15) removed, pressure roller should not climb up the capstan. If it is not parallel, a close fitting pipe may be inserted over the pressure roller shaft to supply leverage for bending it. The pressure roller may also be moved up on its shaft to provide a holding surface for bending. Care must be taken not to nick the shaft.

Idler Wheel (86)

Idler Wheel (86) should contact flywheel (70) squarely and not at an angle. With the tape speed selector (82) set to 3 3/4 inches per second, idler wheel (86) should contact the small diameter portion of the motor shaft. If the idler wheel is too low, it will rub on the large diameter of the motor shaft. The idler wheel arm can be reformed to place the idler wheel in the correct position. The number of washers under the idler wheel may be varied to prevent vertical play.

Pressure Pads

The pressure pads must clear the erase head housing and rest firmly and freely against the pole pieces. The pressure pad arms are made of soft metal which can easily be formed to properly position the

pads against the pole pieces. The pads may be replaced by carefully pulling them from the pad arms and inserting new pads using house hold cement.

Clutch Assembly

There is no adjustment to be made on clutch and brake drum assembly (90). If excessive slippage occurs, the worn part or unit should be replaced.

ELECTRICAL ADJUSTMENTS

Heads Alignment

Peaking the play-record heads (35 and 36) requires the following equipment:

1. Phillip's head screwdriver

2. 6500-cycle Pre-recorded alignment tape.

3. VT Voltmeter

Adjust VTVM to 10 volts A. C. scale and attach to "Output" receptacle of the recorder. Turn speed selector to 7 1/2 inches per second position. Adjust "Volume" and "Tone" controls to maximum position.

Place recorder in "Play" position, either in the "Left" position or the "Right" position, depending on which head is to be align first. Then insert Phillip's head screwdriver into adjustment screw.

Loosening and tightening the screw determines the point at which the maximum meter reading is obtained.

In magnetic tape recorders, the high frequency response is extremely sensitive to the alignment of the recording head, and of the contact between tape and recording head.

For reasons of standardization, an attempt is made to align the head gaps on all recorders exactly perpendicular to the tape.

This alignment is accomplished by tilting the heads for maximum output from a pre-recorded alignment tape upon which a steady 6, 500 C. P. S. signal is available.

If the reproducing gaps are not parallel to the recording poles, serious loss of high frequencies, track over lap may result.

Eye Adjustments

The purpose of the magic-eye tube is to indicate when the proper level of signal is being applied to the recording head. If this circuit is not adjusted correctly or not operating properly, it will cause an incorrect level of signal to be applied to the recording head. This can result in a weak recording or an overdriven distorted recording. The eye adjustment is accomplished as follows:

1. Connect leads of No. 2927 input cord to output lugs of an audio generator and insert into input jack of the recorder.

2. Connect a 3 to 4 ohm non-inductive 25 watt resistor to the leads of a No. 2928 output cord or to an ordinary microphone plug. Insert plug into output jack of recorder.

3. Set tone control to Monitor position; set speed control to 7 1/2 I. P. S.

4. Set the audio generator to 1 KC (sine wave). Adjust output control of the generator until a reading of 1 volt is obtained with a VTVM at the output lugs of the audio generator.

5. Turn volume control until a reading of 1 volt AC is obtained across the 3 to 4 ohm resistor.

6. Adjust eye control (R3) until eye just closes.

Note: This adjustment depends on the 12AB5 tubes and their associated components being good. Therefore, these circuit should be checked before making this adjustment.

LUBRICATION

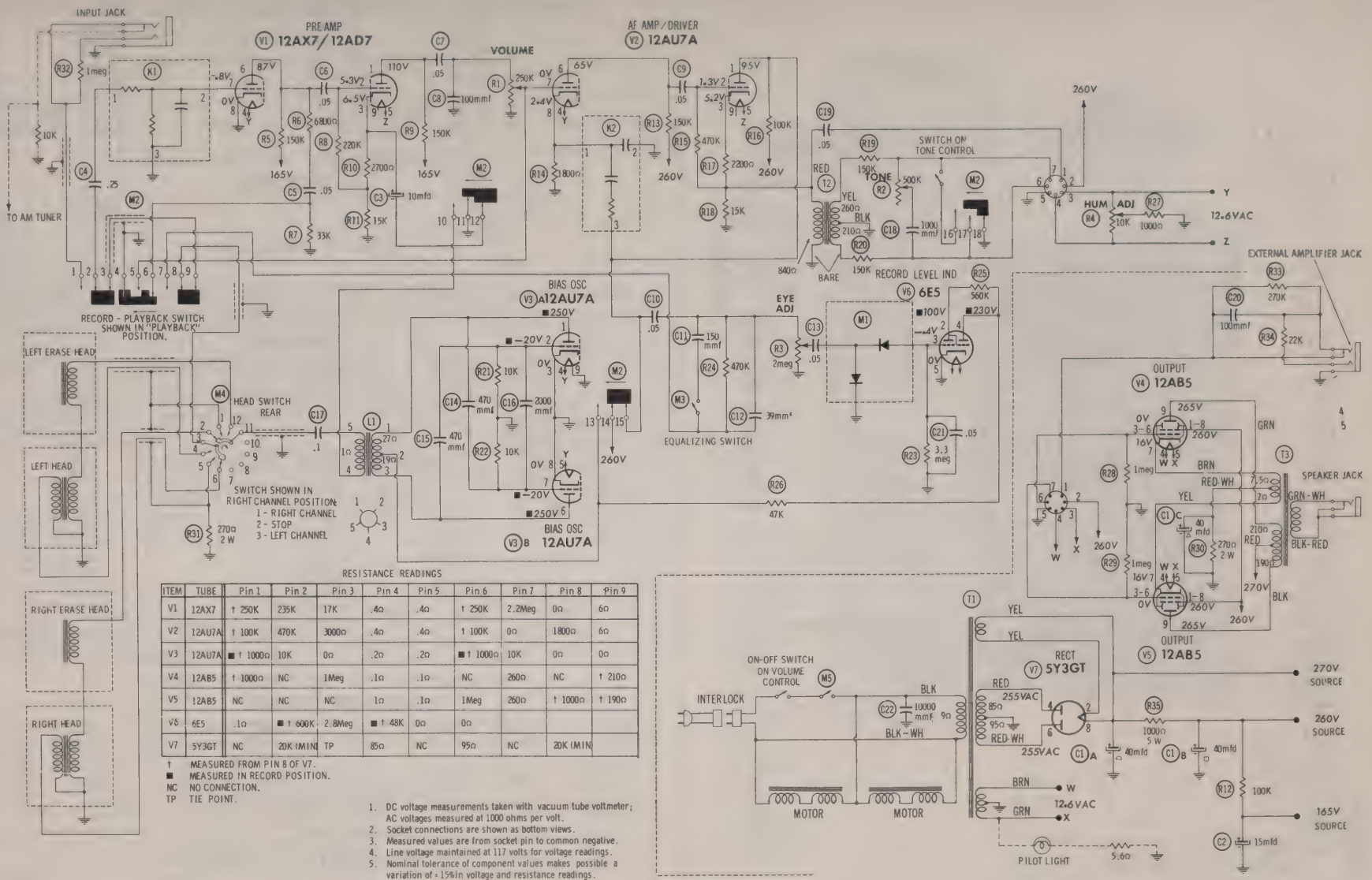
When required, as indicated by binding or other abnormal operation, lubricate the points indicated on the exploded views. Points indicated by a dot (●) on the exploded views should be lubricated with a drop or two of No. 10 light sewing machine type oil. Points indicated by a square (■) on the exploded views should be lubricated with a high temperature grease of medium consistency. The basic rule is--do not over lubricate. Oil and grease must be kept off all rubber idlers, belts and periphery of flywheel and off parts that might transfer oil or grease to them. Always wipe excess lubricant from parts that have been lubricated.

CLEANING

The majority of defects, other than wear or breakage, can be traced to dirty surfaces. The recording heads capstan and pressure roller (17) are subject to an accumulation of tape coating residue, which is worn off the tape as it passes these parts. This accumulation should be periodically removed since it may cause faint recording and poor play-back. Wipe off the above surfaces carefully with a clean cloth. If dirt is caked or hard and will not come off with a dry cloth, dampen cloth slightly with Carbon Tetrachloride.

TROUBLE CHART

TROUBLE	POSSIBLE CAUSES
Take-Up reel fails to rotate in "Play" or "Record"	1. Brake pad assemblies (62) or (95) operating improperly. 2. Faulty clutch assemblies (90). 3. Binding or bent take-up reel shaft. 4. Defective motors.
Counter does not register.	1. Counter belt (58) broken. 2. Re-set wheel binding on top plate.
Erratic tape speed.	1. Oil or grease on motor pulleys, idler wheels (86), capstan drum (70), or pressure roller (17). 2. Worn idler wheels (86). 3. Brake assemblies (62) or (92) not releasing properly. 4. Capstan assembly (70) binding. 5. Supply reel drum (90) binding. 6. Bent or binding motor shaft. 7. Motor bearing in need of oil. 8. Spring (72) not strong enough to hold idler wheels (86) in good contact with motor pulley and capstan drum (70).
Motor fails to operate.	1. Motor defective electrically. 2. Bent or binding motor shaft. 3. Motor bearing in need of oil.
Pressure roller (17) fails to engage capstan in "Play" or "Record".	1. Loose set screws in pressure roller cam (14). 2. Binding pressure roller assembly (19).
Erase head pads (29) or (24) fail to move properly in "Stop", "Play", or "Record".	1. Springs (28) or (25) missing, disconnected, or broken. 2. Springs (23) missing, disconnected or broken. 3. Binding pad assemblies (27) or (31).
Capstan fails to rotate in "Play" and "Record" but motors operates.	1. Spring (72) broken or disconnected. 2. Oil or grease on motor shafts, idler wheels (86), and capstan drum (70).
Motors operates only in "Stop" and "Rewind".	1. Capstan shaft or drum (70) bent and binding.
Supply reel spills tape when record-playback control is turned to "Stop".	1. Worn brake pad on brake assemblies (92) or (62).
Failure to "Fast Rewind".	1. Oil or grease on motor pulleys, and clutch drive wheels (90F). 2. Brake assemblies (62) or (95) operating improperly. 3. Motors not operating.



RESISTANCE READINGS

ITEM	TUBE	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Pin 9
V1	12AX7	† 250K	235K	17K	.4Ω	.4Ω	† 250K	2.2Meg	0Ω	6Ω
V2	12AU7A	† 100K	470K	3000Ω	.4Ω	.4Ω	† 100K	0Ω	1800Ω	6Ω
V3	12AU7A	■ † 1000Ω	10K	0Ω	.2Ω	.2Ω	■ † 1000Ω	10K	0Ω	0Ω
V4	12AB5	† 1000Ω	NC	1Meg	.1Ω	.1Ω	NC	260Ω	NC	† 210Ω
V5	12AB5	NC	NC	NC	1Ω	.1Ω	1Meg	260Ω	† 1000Ω	† 190Ω
V6	6E5	.1Ω	■ † 600K	2.8Meg	■ † 48K	0Ω	0Ω			
V7	5Y3GT	NC	20K (MIN)	TP	85Ω	NC	95Ω	NC	20K (MIN)	

† MEASURED FROM PIN 8 OF V7.
■ MEASURED IN RECORD POSITION.
NC NO CONNECTION.
TP TIE POINT.

1. DC voltage measurements taken with vacuum tube voltmeter; AC voltages measured at 1000 ohms per volt.
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to common negative.
4. Line voltage maintained at 117 volts for voltage readings.
5. Nominal tolerance of component values makes possible a variation of ± 15% in voltage and resistance readings.
6. All controls at minimum, proper output load connected.

A PHOTOFACT STANDARD NOTATION SCHEMATIC
Howard W. Sams & Co., Inc. 1958

393-12

PARTS LIST AND DESCRIPTIONS

TUBES (GENERAL ELECTRIC, SYLVANIA)

ITEM No.	USE	TYPE	NOTES
V1	Preamplifier	12AX7	
V2	Amp. & Driver	12AU7A	
V3	Bias Osc.	12AU7A	
V4	Output	12AB5	
V5	Output	12AB5	
V6	Tuning Eye	6E5	
V7	Rectifier	5Y3-GT	

ELECTROLYTIC CAPACITORS

ITEM No.	RATING CAP.	RATING VOLT.	REPLACEMENT DATA WEBCOR PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	PYRAMID PART No.	SANGAMO PART No.	SPRAGUE PART No.
C1A	▲40	400	30P292	AFH3-134	C1080	FP369-1	TMT-134	T-685	TVL-3744-2
B	■40	350							
C	▲40	25							
C2	15	300	30P281	PRS350V16	BR1635	TC64	TD-16-350	MT-3516	TVA-1607
C3	10	25	30P290	PRS25V10	BBR10-25	TC22	TD-10-25	MT-0210	TVA-1204

FIXED CAPACITORS

Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING CAP.	RATING VOLT	REPLACEMENT DATA WEBCOR PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ERIE PART No.	MALLORY PART No.	SPRAGUE PART No.	NOTES
C4	.25	50	30P293	P288N-22		CUB2P22		GEM-2025	2SE-P22	
C5	.05	400	30P283			BC6S47J		ACE615	4SE-S47	
C6	.05	400	30P283			BC6S47J		ACE615	4SE-S47	
C7	.05	400	30P283			BC6S47J		ACE615	4SE-S47	
C8	100		30P282		DD-101	L10T1	ED-100	MCB235	MS-31	10%
C9	.05	400	30P283			BC6S47J		ACE615	4SE-S47	
C10	.05	400	30P283			BC6S47J		ACE615	4SE-S47	
C11	150		30P303		DD-151	L10T15	ED-150	MCB236	MS-315	10%
C12	39		30P316	N750-SI39	TCN-39	C10Q39U	TC7-39			N750 10%
C13	.05	400	30P283			BC6S47J		ACE615	4SE-S47	
C14	470		30P298		D6-471	5R5T47	ED-470		MS-347	10%
C15	470		30P298		D6-471	5R5T47	ED-470		MS-347	10%
C16	2000		30P286			1R5D2			MS-22	10%
C17	.1	50	30P289			BC2P1J		ACE401	2SE-P10	
C18	1000		30P291	BPD-001	DD-102	BYA6D1	ED-1000	DC521	5HK-D1	
C19	.05	400	30P283			BC6S47J		ACE615	4SE-S47	
C20	100		30P180	SI100	D6-101	LT6T1	GP-100	UC-531	5GA-T1	
C21	.05	400	30P283			BC6S47J		ACE615	4SE-S47	
C22	10000	900	30P220	DAC-27		BYA10S1M		GEM-10S1	BL-S10	

CONTROLS

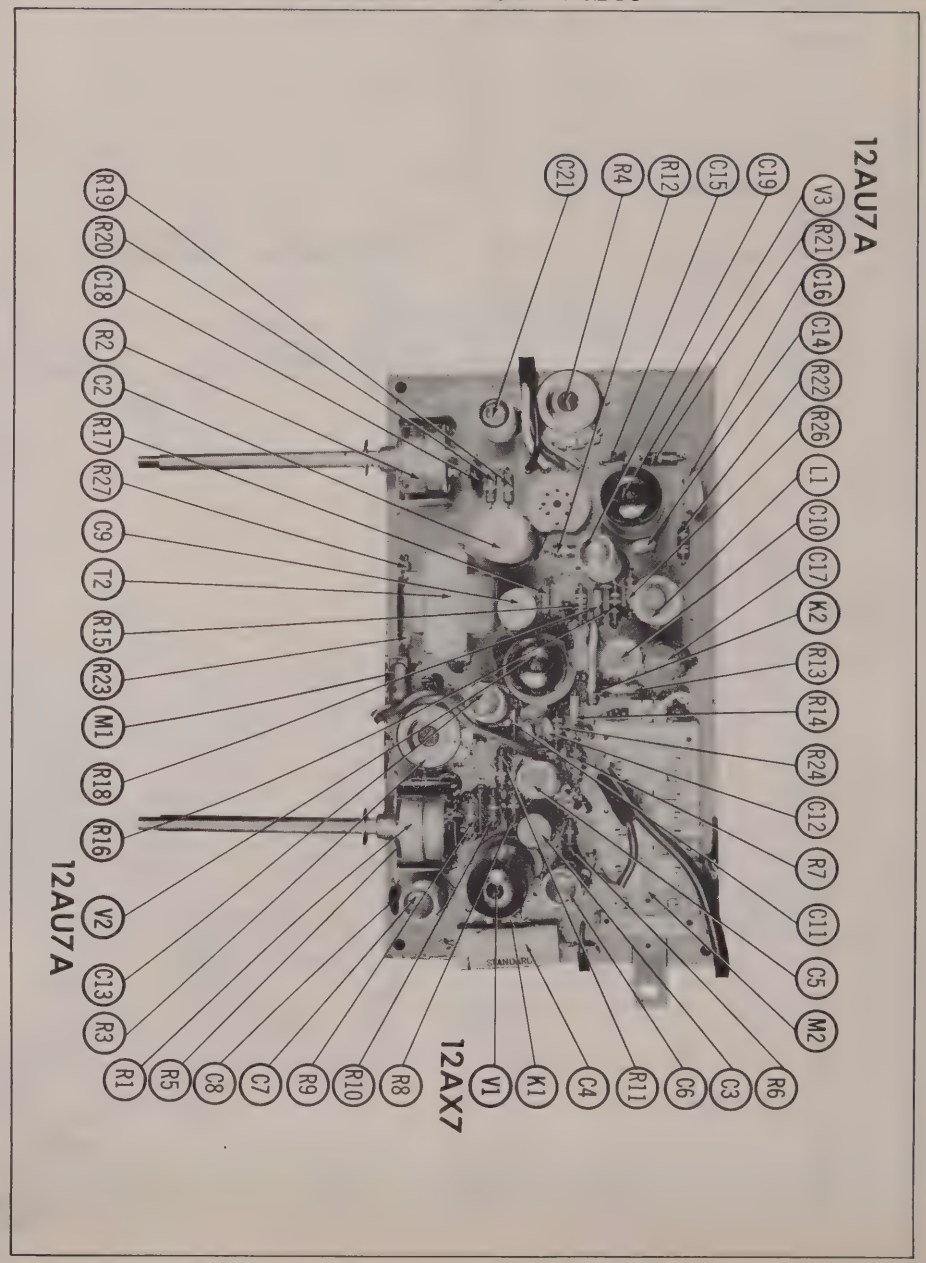
ITEM No.	RATING RESISTANCE	RATING WATTS	REPLACEMENT DATA WEBCOR PART No.	CENTRALAB PART No.	CLAROSTAT PART No.	IRC PART No.	MALLORY PART No.	INSTALLATION NOTES
R1A	250K	½	31P126					Volume
B	Switch							
R2A	500K	½	31P127					Tone
B	Switch							Monitor
R3	2Meg	½	31P122					Eye Adjust
R4	10K	½	31P123					Hum Adjust

RESISTORS

All wattages 1/2 watt, or less, unless otherwise listed.

ITEM No.	RATING OHMS	RATING WATT	WEBCOR PART No.	NOTES
R5	150K		29M1542	
R6	6800Ω		29M6822	
R7	33K		29M3332	
R8	220K		29M2242	
R9	150K		29M1542	
R10	2700		29M2722	
R11	15K		29M1532	
R12	100K		29M1042	
R13	150K		29M1542	
R14	1800Ω		29M1822	
R15	470K		29M4742	
R16	100K		29M1042	
R17	2200Ω		29M2222	
R18	15K		29M1532	
R19	150K		29M1542	
R20	150K		29M1542	

CHASSIS—TOP VIEW



PARTS LIST AND DESCRIPTIONS (Continued)

RESISTORS

All wattages 1/2 watt, or less, unless otherwise listed.

ITEM No.	RATING OHMS	RATING WATT	WEBCOR PART No.	NOTES
R21	10K		29M1032	
R22	10K		29M1032	
R23	3.3Meg		29M3352	
R24	470K		29M4742	
R25	560K		29M5642	
R26	47K		4732	
R27	1000Ω		29M1022	
R28	1Meg		29M1052	
R29	1Meg		29M1052	
R30	270Ω	2	29M2714	
R31	270Ω	2	29M2714	
R32	1Meg		29M1052	
R33	270K		29M2742	
R34	22K		29M2232	
R35	1000	5	29P072	

TRANSFORMER (POWER)

ITEM No.	RATING PRI.	RATING SEC. 1	RATING SEC. 2	RATING SEC. 3	REPLACEMENT DATA WEBCOR PART No.	Halldorson PART No.	Merit PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.
T1	117VAC @ .50A	500VCT @ .062A	5V @ 2A	12.6V @ 1A	68P039-2					

TRANSFORMER (DRIVER)

ITEM No.	IMPEDANCE PRI.	IMPEDANCE SEC.	REPLACEMENT DATA WEBCOR PART No.	Halldorson PART No.	Merit PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.	NOTES
T2	2:	1	67P055-3				20A16 ①		① Drill new mtg. hole.

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	IMPEDANCE PRI.	IMPEDANCE SEC.	REPLACEMENT DATA WEBCOR PART No.	Halldorson PART No.	Merit PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.	NOTES
T3	9000Ω CT	6-8Ω	67P056-3						

SPEAKER

ITEM No.	TYPE SIZE	TYPE FIELD	TYPE V. C. IMP.	REPLACEMENT DATA WEBCOR PART No.	QUAM PART No.	NOTES
SP1	6"	PM	6-8Ω	76P061	6A13Z8.5	

COIL

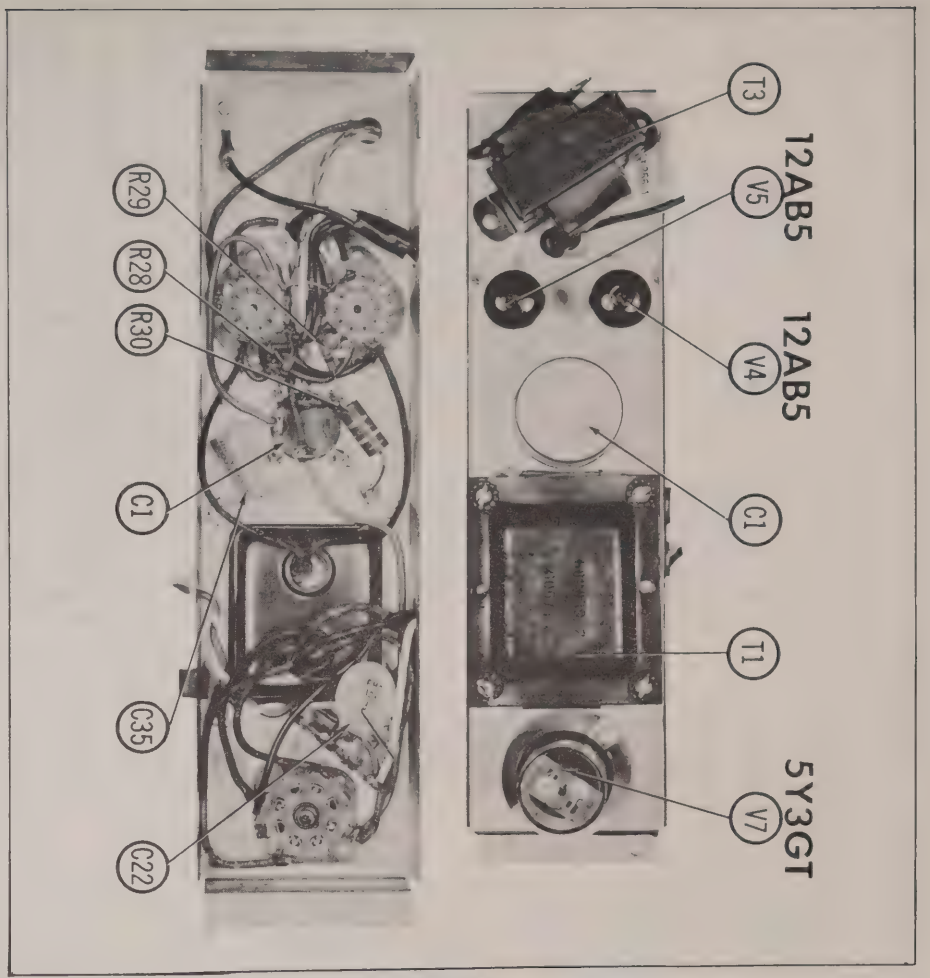
ITEM No.	USE	REPLACEMENT DATA WEBCOR PART No.	MEISSNER PART No.	MERIT PART No.	MILLER PART No.	NOTES
L1	Bias Osc.	65P125				

COMPONENT COMBINATIONS

ITEM No.	USE	DESCRIPTION	WEBCOR PART No.	REPLACEMENT DATA
K1	High Frequency Filter		62P015	

SELENIUM RECTIFIER

ITEM No.	RATING CURRENT (Measured)	REPLACEMENT DATA WEBCOR PART No.	FEDERAL PART No.	INTERNATIONAL PART No.	SARKES TARZIAN PART No.	NOTES
M1	Signal	65P124 ①	1215 ① ②	1T1 ① ②		① Sel. Diode ② 2 Required.



MISCELLANEOUS

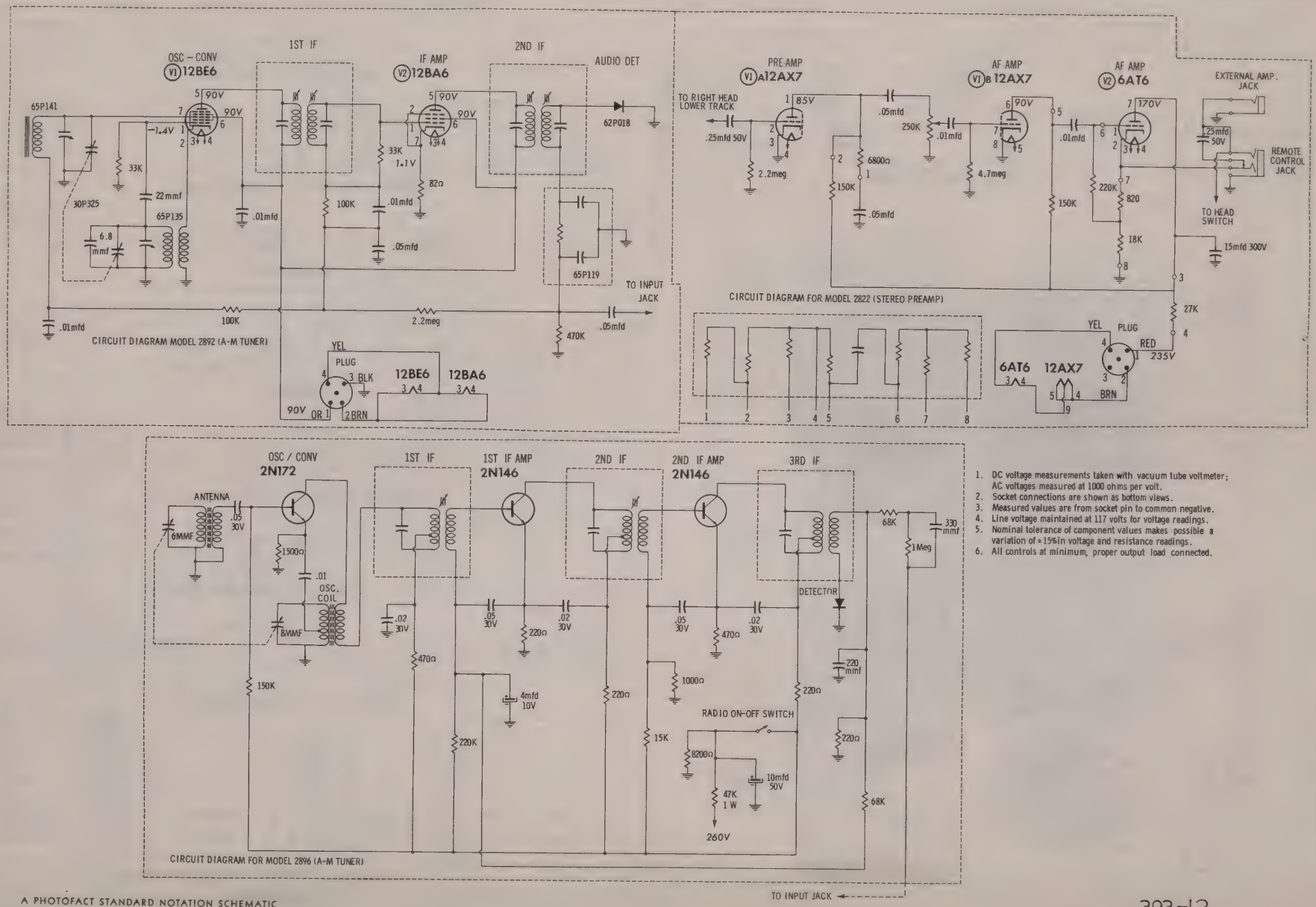
ITEM No.	PART NAME	WEBCOR PART No.	NOTES
M2	Switch	32X117	Record and playback (Slide Contact Type)
M3	Switch	32P091	Equalizing
M4	Switch	32P120	Rotary Head
M5	Switch	32X119	Automatic Shut-off

WIRING DATA

General-use Unshielded Hook-up Wire ..... Use BELDEN No. 8530 (Solid) Available in Ten Colors
8524 (Stranded) Available in Ten Colors

Power Cord (Interlock Type) ..... Use BELDEN No. 8874

Low-Loss Shielded Lead (Interconnecting) ..... Use BELDEN No. 8401



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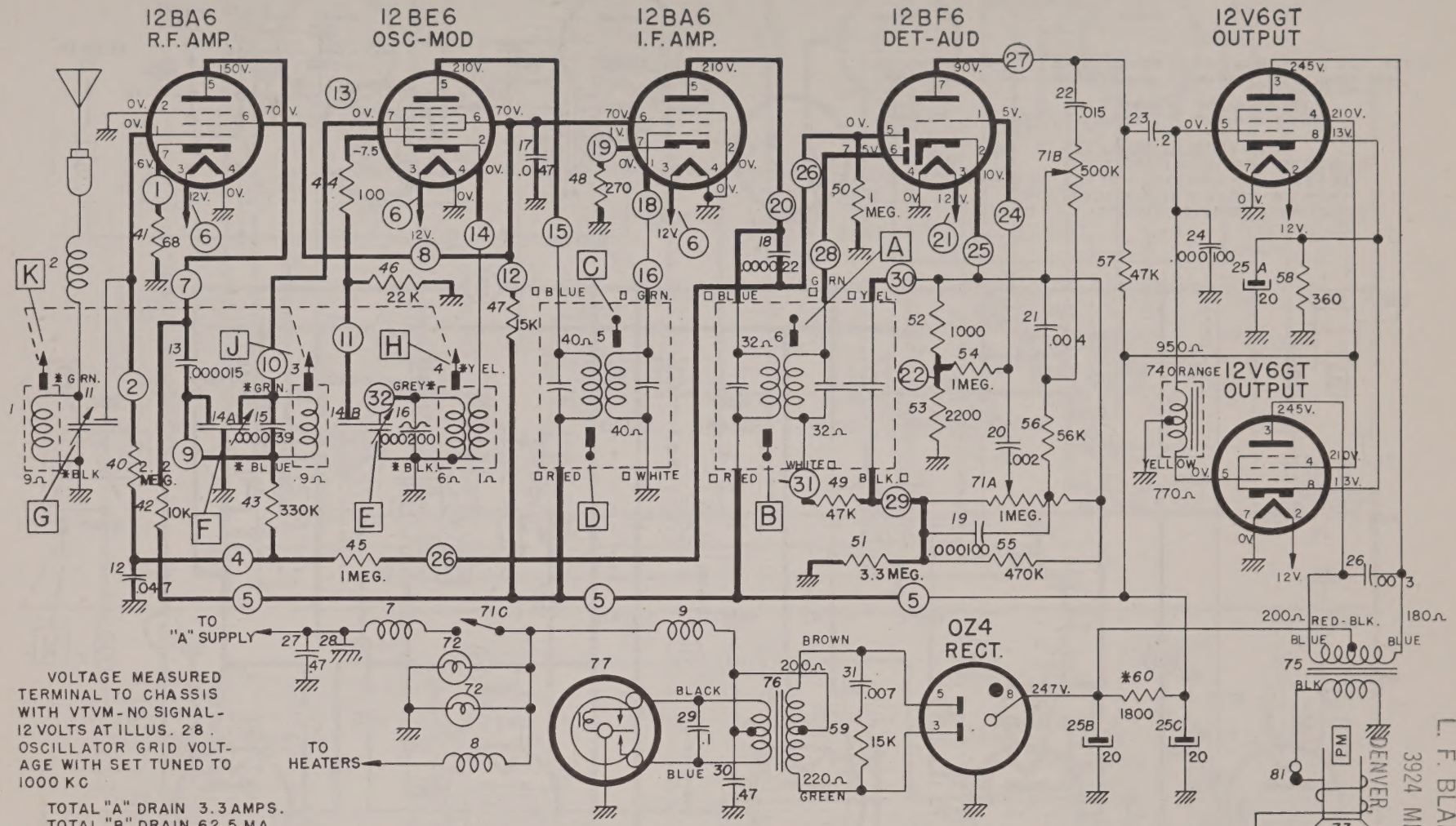
A PHOTOFACT STANDARD NOTATION SCHEMATIC
Howard W. Sams & Co., Inc. 1958

Ref. No.	Part No.	Description
1	39P175-1	Push Button "Record" Knob, Models 2816, 2896
	39P175-2	Push Button "Record" Knob, Models EP2812, EP2822, EP2892
	39P175-3	Push Button "Record" Knob, Models WP2812, WP2822, WP2892
2	11X1790-CP	Shift-Wing Knob Ass'y, Models 2816, 2896
	11X1790-AF	Shift-Wing Knob Ass'y, Models EP2812, EP2822, EP2892
	11X1790-AL	Shift-Wing Knob Ass'y, Models WP2812, WP2822, WP2892
3	49P292-1	Control Knob, Models 2816, 2896
	49P292-2	Control Knob, Models EP2812, EP2822, EP2892
	49P292-3	Control Knob, Models WP2812, WP2822, WP2892
4	49P296-1	Rear Escutcheon "Webcor" Models 2816, 2896
	11X1934-1	Rear Escutcheon "Webcor", Models EP2812, EP2822, EP2892
	11X1934-2	Rear Escutcheon "Webcor", Models WP2812, WP2822, WP2892
5	26P1370-1	Rear Escutcheon Mounting Screws Models 2816, 2896
	26P1370-2	Rear Escutcheon Mounting Screws Models 2812, 2822, 2892
6	26P1500-3	Rear Escutcheon Mounting Screws
7	26P1446-4	Head Cover Mounting Screws, Models 2816, 2896
	26P1446-2	Head Cover Mounting Screws, Models 2812, 2822, 2892
8	49P302-1AV	Head Cover "High Fidelity", Models 2816, 2896
	49P302-1AF	Head Cover "High Fidelity", Models EP2892
	49P302-1AL	Head Cover "High Fidelity", Models WP2892
	49P302-2AF	Head Cover "Stereofonic", Model EP2822
	49P302-2AL	Head Cover "Stereofonic", Model WP2822
	49302-4AF	Head Cover, "Royal", Model EP2812
	49302-4AL	Head Cover, "Royal", Model WP2812
9	41P1492	Shoulder Screw
10	26P1448-4	Top Escutcheon Plat Mounting Screws Models 2816, 2896
	26P826	Top Escutcheon Plat Mounting Screws Models 2812, 2822, 2892
11	11X1792-1	Top Escutcheon Plate Ass'y, Model 2816
	11X1792-2	Top Escutcheon Plate Ass'y, Model 2896
	11X1792-3	Top Escutcheon Plate Ass'y, Models EP2812, EP2822
	11X1792-4	Top Escutcheon Plate Ass'y, Models WP2812, WP2822
	11X1792-5	Top Escutcheon Plate Ass'y, Model EP2892
	11X1792-6	Top Escutcheon Plate Ass'y, Model WP2892
12	49P294-1BA	Front Escutcheon, Model 2816
	49P295-1BA	Front Escutcheon, Model 2896
	49P294-2AF	Front Escutcheon, Models, EP2812, EP2822
	49P294-2AL	Front Escutcheon, Models, WP2812, WP2822
	49P295-2AL	Front Escutcheon, Model, WP2892
	49P295-3AF	Front Escutcheon, Model, EP2892
13	26P1451	Set Screw
14	11X687	Cam And Hub Ass'y
15	50P224	Srping Clip
16	25P183	Washer
17	11X673	Pressure Roller Ass'y
18	25P370	Washer
19	11X686	Pressure Roller Ass'y
20	46P187	Tension Spring
20A	46P017	Tension Spring
21	50P224	Spring Clip
22	25P010	Washer
23	46P145	Tension Spring
24	11X1777	Erase Arm And Pad Ass'y(Right)
24A	23P027	Felt Pad-Erase
25	46P479	Tension Spring
26	11X1776	Pressure Arm And Guide Ass'y(Right)
26A	49P299	Tape Guide
27	11X1775	Pressure Arm And Erase Pad Ass'y Complete(Right)
28	46P479	Tension Spring
29	11X1780	Erase Arm And Pad Ass'y(Left)
29A	23P027	Felt Pad-Erase
30	11X1779	Pressure Arm And Guide Ass'y (Left)
30A	49P299	Tape Guide
31	11X1778	Pressure Arm And Erase Pad Ass'y Complete(left)
32	45P2304	Hum Control Bracket(Right)
32A	45P2303	Hum Control Bracket(Left)
33	11X1765	Erase Head Ass'y, Right Hand
33A	26P1506-3	Erase Head Mounting Screw, Right Hand
34	11X1765	Erase Head Ass'y, Left Hand
34A	26P1495-3	Erase Head Mounting Screw, Left Hand
35	11X1690	Record-Playback Head Ass'y, Left
36	11X1690	Record-Playback Head Ass'y Right
37	46P478	Tension Spring
38		Head Bridge & Stud Ass'y.
39	45P2300	Tape Guide
40	46P248	Spring
41	45P1064	Control Link
42	11X1868	Bell Crank And Stud Ass'y.
43	45P2297	Guide Arm Link
44	11X1782	Guide Arm And Hub Ass'y.
45	41P1631	Control Shaft
46	11X890	Control Index And Stud Ass'y
47	46P289	Compression Spring
48	41P1103	Collar For Index And Shaft Ass'y.
49	45P2236	Actuating Lever For Sliding Cam
50	50P224	Spring Clip
51	45P2301	Switch Arm
52	11X1668	Cam Plate Ass'y.
53	11X647	Idler Arm Ass'y.

MECHANICAL PARTS LIST (Con't)

Ref. No.	Part No.	Description
54	11X1772	Idler Arm And Wheel Ass'y. Models 2816, 2896
	11X1785	Idler Arm And Wheel Ass'y. Models 2812, 2822, 2892
55	11X672	Roller Arm Ass'y.
56	46P488	Tension Spring
57	46P248	Tension Spring
58	72P006	Rubber Belt-Tape Counter
59	11X1770-AV	Clutch And Brake Drum Ass'y., Models 2816, 2896, EP2812, EP2822, EP2891
	11X1770-GF	Clutch And Brake Drum Ass'y., Models WP2812, WP2822, WP2892
60	11X1664	Bracket And Stud Ass'y.
61		Base Plate
62	11X653	Right Brake Shoe Ass'y.
63	46P139	Tension Spring
64	11X1516	Reel Arm Ass'y(Right)
65	11X657	Brake Bell Crank Ass'y., Right Hand
66	45P2278	Right Hand Support, Models 2816, 2896
	45A2486	Right Hand Support, Models 2812, 2822, 2892
67	74X006-1	Tape Counter Ass'y., Models 2816, 2896
	74X006-2	Tape Counter Ass'y., Models EP2812, EP2822, EP2892
	74X006-3	Tape Counter Ass'y., Models WP2812, WP2822, 2892
68	11X1768	Front Bracket, Post And Switch Ass'y. Models 2816, 2896
	11X1787	Front Bracket And Switch Ass'y. Model 2892
	11X1786	Front Bracket And Switch Ass'y. Models 2812, 2822
69	45P2277	Left Hand Support, Models 2816, 2896
69A	45P2487	Left Side Plate, Models 2812, 2822, 2892
70	11X650	Capstan Ass'y.
71	49P305	Spacer
72	46P271	Tension Spring
73	46P235	Tension Spring
74	11X659	Crank Arm Ass'y., Right Hand
75	46P239	Tension Spring
75A	50P253	Retainer Ring
76	11X661	Speed Change Lever Ass'y.
77	11X660	Crank Arm Ass'y., Left Hand
78	46P061	Tension Spring
79	11X655	Bell Crank Ass'y., Right Hand
80	11X656	Bell Crank Ass'y., Left Hand
81	41P802	Capstan Shaft
82	42X402-1BA	Speed Change Cam Models 2816, 2896
	42X402-1AV	Speed Change Cam Models 2812, 2822, 2892
83	26P248	Reel Arm Mounting Screws
84	50P125	Spring Clip
85	25P046	Washer
86	11X754	Idler Wheel And Tire Ass'y.
87	25P046	Washer
88	50P125	Spring Clips
89	11X647	Idler Arm Ass'y.
90	11X1770-AV	Clutch And Brake Drum Ass'y. Models, 2816, 2896, EP2812, EP2822, EP2892
	11X1770-GF	Clutch And Brake Drum Ass'y. Models, WP2812, WP2822, WP2892
90A	11X1513-AV	Brake Drum And Bearing Ass'y, Models EP2812, EP2822, EP2892, 2816, 2896
	11X1513-GF	Brake Drum And Bearing Ass'y., Models WP2812, WP2822, WP2892
90B	46P360	Clutch Spring
90C	45P1739	Clutch Housing Cover (Upper)
90D	25P615	Clutch Disc.
90E	45P1812	Clutch Housing Cover (Lower)
90F	11X1771	Clutch Housing And Bearing Ass'y
90G	25P613	Fibre Washer
90H	25P614	Washer
90J	50P301	Retaining Ring
91	11X658	Brake Belt Crank Ass'y., Left Hand
92	46P248	Tension Spring
93	46P139	Tension Spring
94	11X1515	Reel Arm Ass'y, Left Hand
95	11X654	Brake Shoe Ass'y. Left Hand
96	50P224	Spring Clip
97	46P487	Tension Spring (2)
98	45P1065	Index Bracket
99	26P746	Index Bracket Mounting Screws
100		Base Plate
101	11X677	Guide Crank And Hub Ass'y
102	46P485	Compression Spring
103	25P473	Washer
104	25P535	Washer
105	11X671	Index Plate Ass'y.
106	11X1899	Crank Plate Ass'y
107	11X1760	Head Switch Crank Ass'y. Bracket
108	46P365	Tension Spring
109	11X1758	Switch Operating Mechanism Ass'y
110	11X1685	Push Rod And Cam Ass'y.
111	11X662	Switch Crank Ass'y
112	26P1450	Set Screw
113	25P551	Grommet
114	15X239	4-Pole Motor, Right Hand
115	15X240	4-Pole Motor, Left Hand
116	45P2433	Mechanism Mounting Rail Models 2812, 2822, 2892
117	11X1920	Mechanism Mounting Rail & Support Bracket Ass'y., Models 2812, 2822, 2892



BUICK MODEL 981902

Schematic Diagram Courtesy of Delco Radio Div., General Motors Corp.

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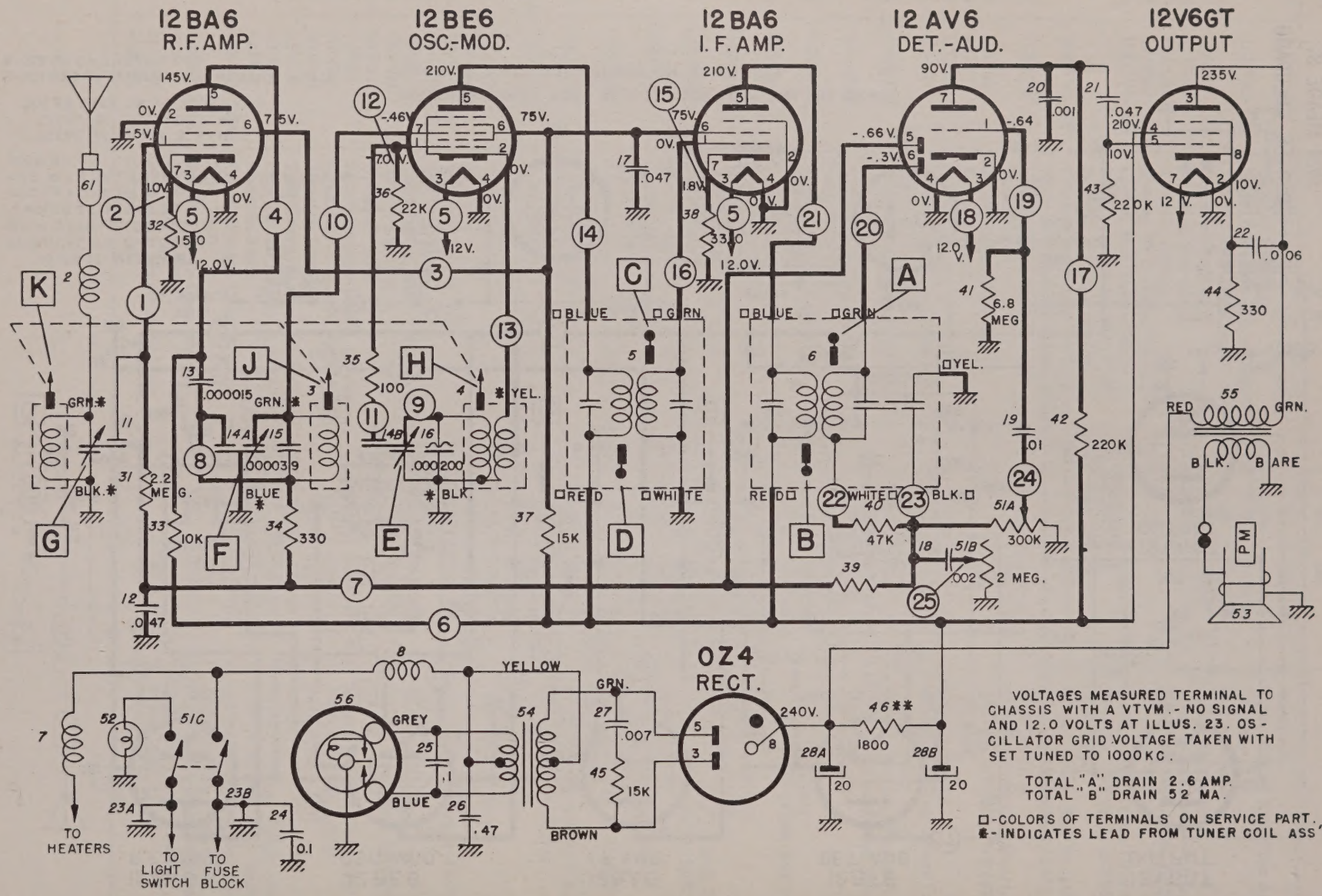
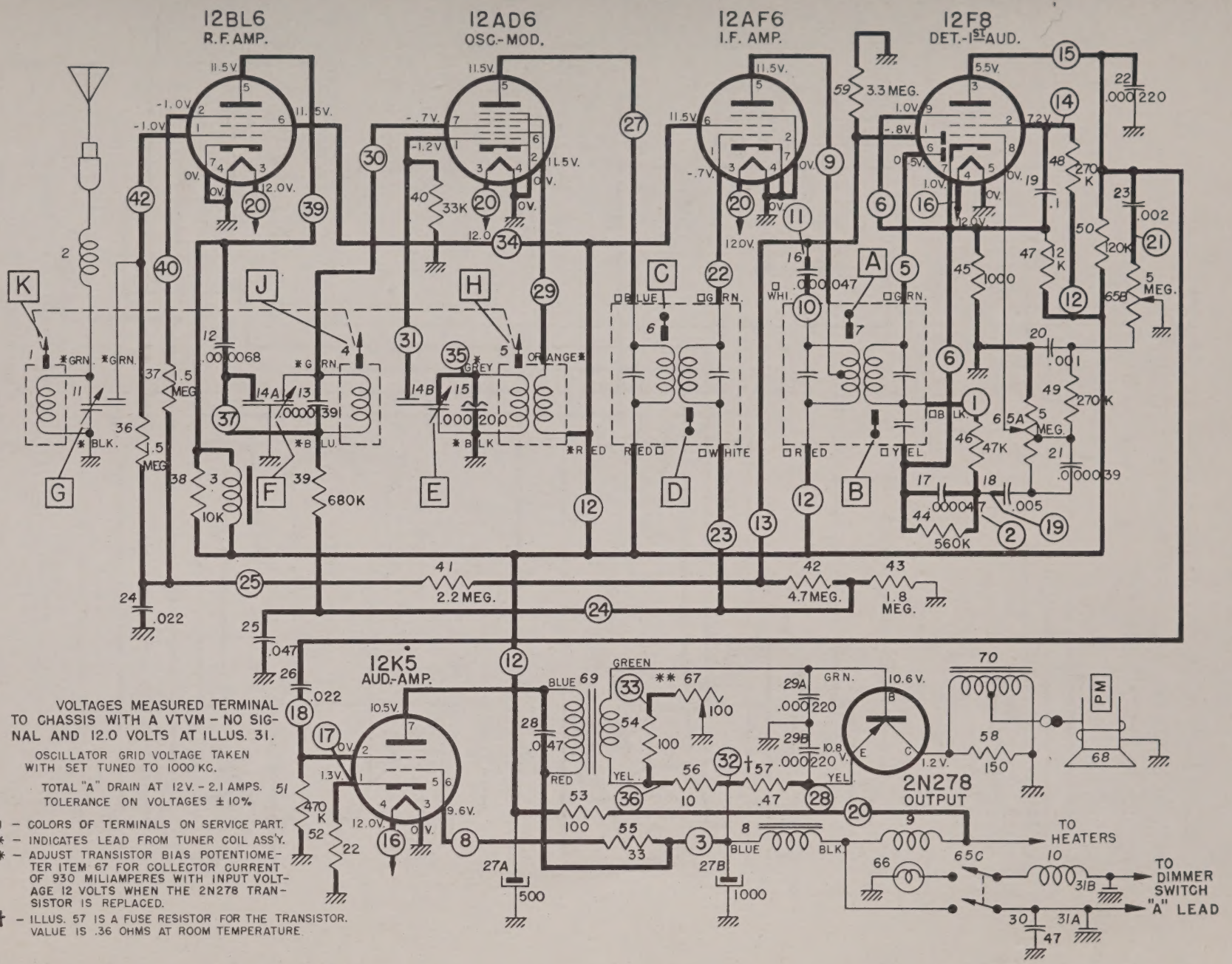
3924 MEADE St.
DENVER, COLORADO



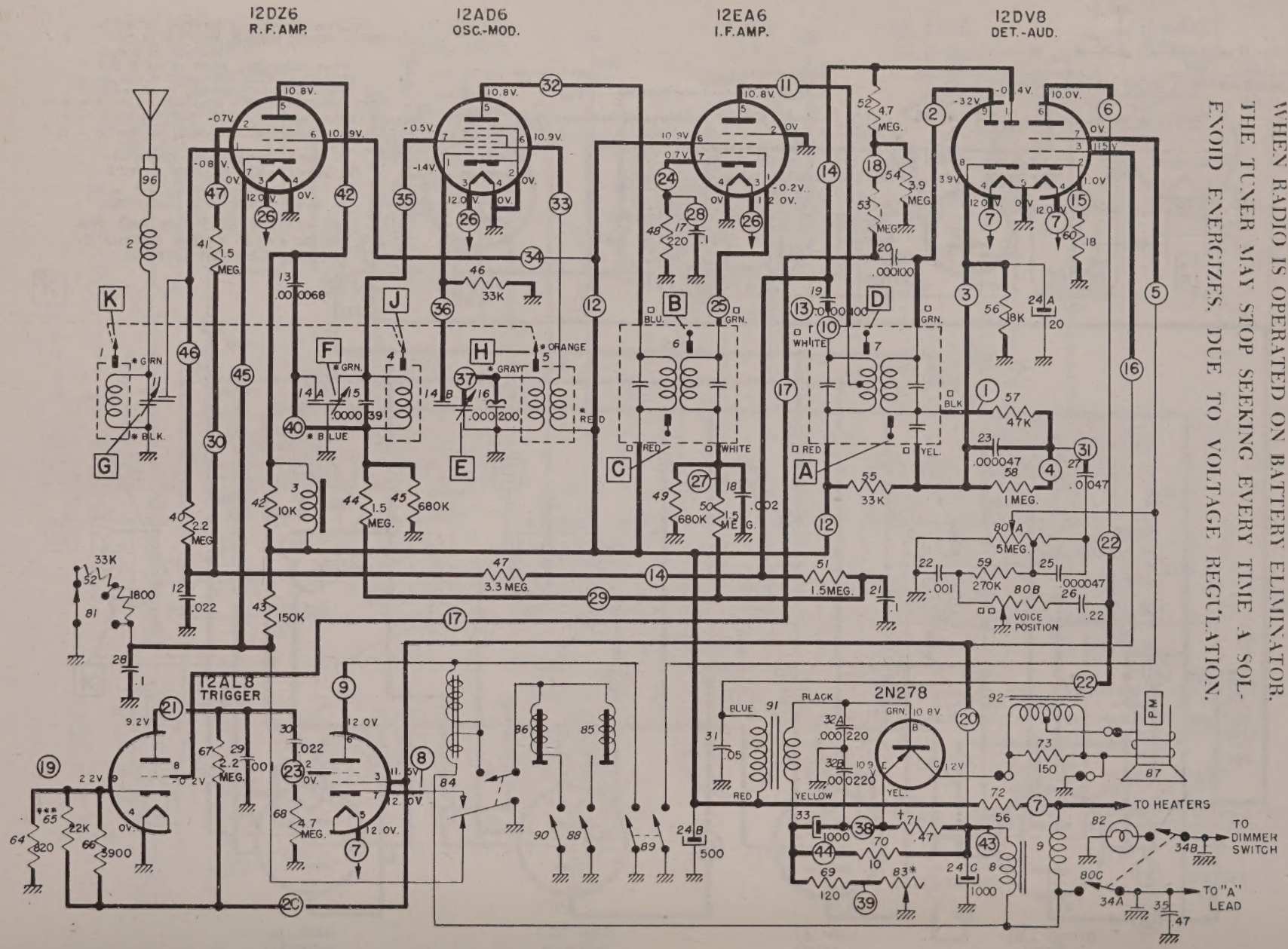
CHEVROLET MODEL 987724 **Schematic Diagram Courtesy of Delco Radio Div., General Motors Corp.**


12BL6
R.F. AMP.
12AD6
OSC.-MOD.
12AF6
I.F. AMP.
12F8
DET.-1ST AUD.
12K5
AUD.-AMP.
2N278
OUTPUT
TO HEATERS
TO DIMMER SWITCH "A" LEAD
PM
VOLTAGES MEASURED TERMINAL TO CHASSIS WITH A VTVM - NO SIGNAL AND 12.0 VOLTS AT ILLUS. 31.
OSCILLATOR GRID VOLTAGE TAKEN WITH SET TUNED TO 1000 KC.
TOTAL "A" DRAIN AT 12V. - 2.1 AMPS. TOLERANCE ON VOLTAGES ± 10%
□ - COLORS OF TERMINALS ON SERVICE PART.
* - INDICATES LEAD FROM TUNER COIL ASS'Y.
** - ADJUST TRANSISTOR BIAS POTENTIOMETER ITEM 67 FOR COLLECTOR CURRENT OF 930 MILIAMPERES WITH INPUT VOLTAGE 12 VOLTS WHEN THE 2N278 TRANSISTOR IS REPLACED.
† - ILLUS. 57 IS A FUSE RESISTOR FOR THE TRANSISTOR. VALUE IS .36 OHMS AT ROOM TEMPERATURE.

CHEVROLET MODEL 987727 — Schematic Diagram Courtesy of Delco Radio Div., General Motors Corp.

SET 393 FOLDER 13-S

CHEVROLET MODELS 987730, 3748611



Schematic Diagram Courtesy of Delco Radio Div., General Motors Corp.